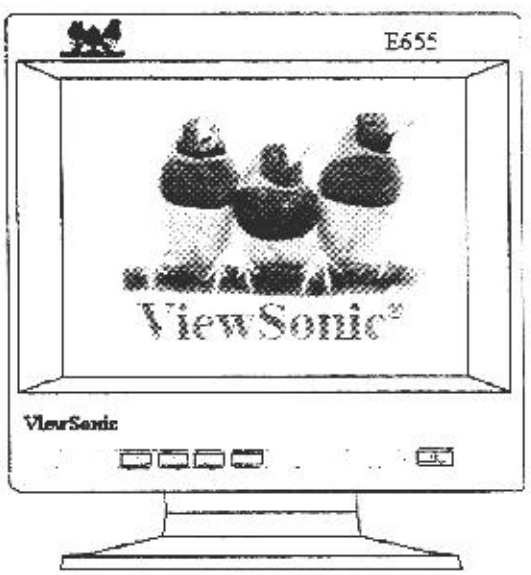
Service Manual

ViewSonic E655

Model No. E655

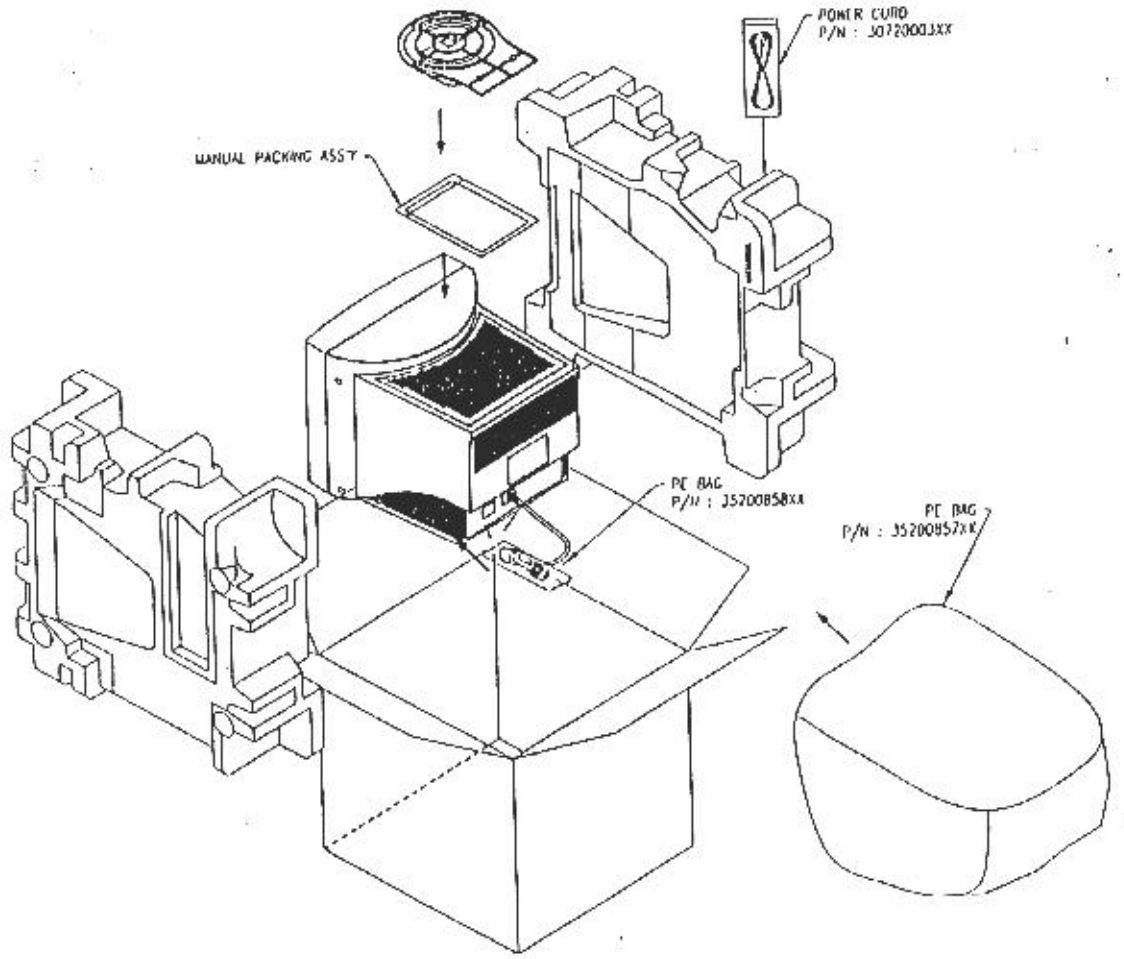
15" Digital Controlled Color Monitor
Entré Series



(Rev. 1 - February 97)

ViewSonic® 20480 E. Business Parkway, Walnut, California 91789 USA - (800) 888-8583

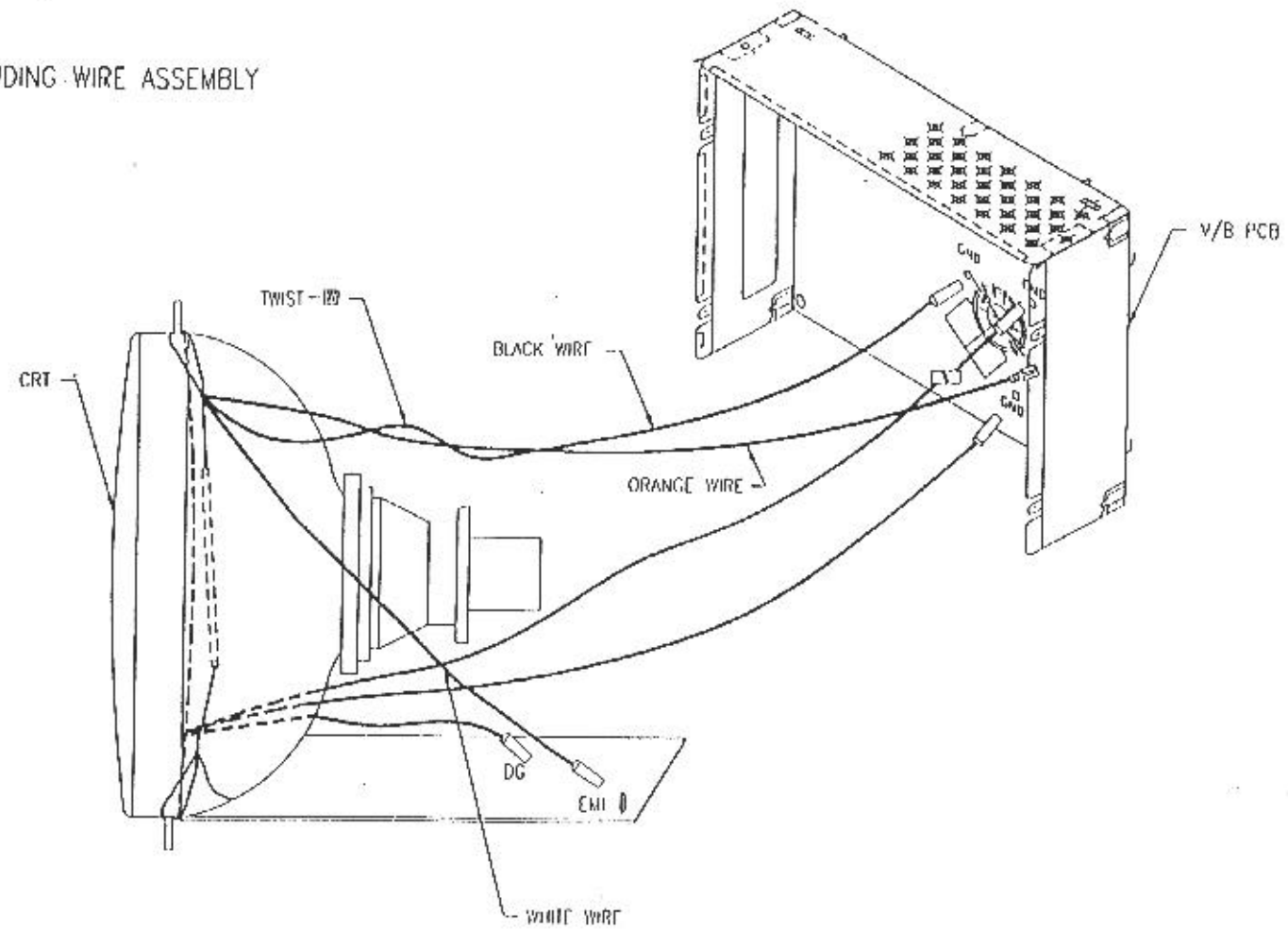
6.5 Packing Assembly



MODE NAME :	VIEWSONIC E655
PAGE :	5 OF X-0

MONITOR E655-1 PRODUCTION NOTICE ITEM

CRT GROUNDING WIRE ASSEMBLY



6.6 CRT Grounding Wire Assembly

MODE NAME :	VIEWSONIC E655
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Chapter 7

CIRCUIT

7. CIRCUIT

7.1 Block Diagram 7-1
7.2 Power Supply Circuit 7-2
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7.4 Horizontal Deflection Circuit 7-5
7.5 Vertical Deflection Circuit 7-6
7.6 Video Circuit 7-7
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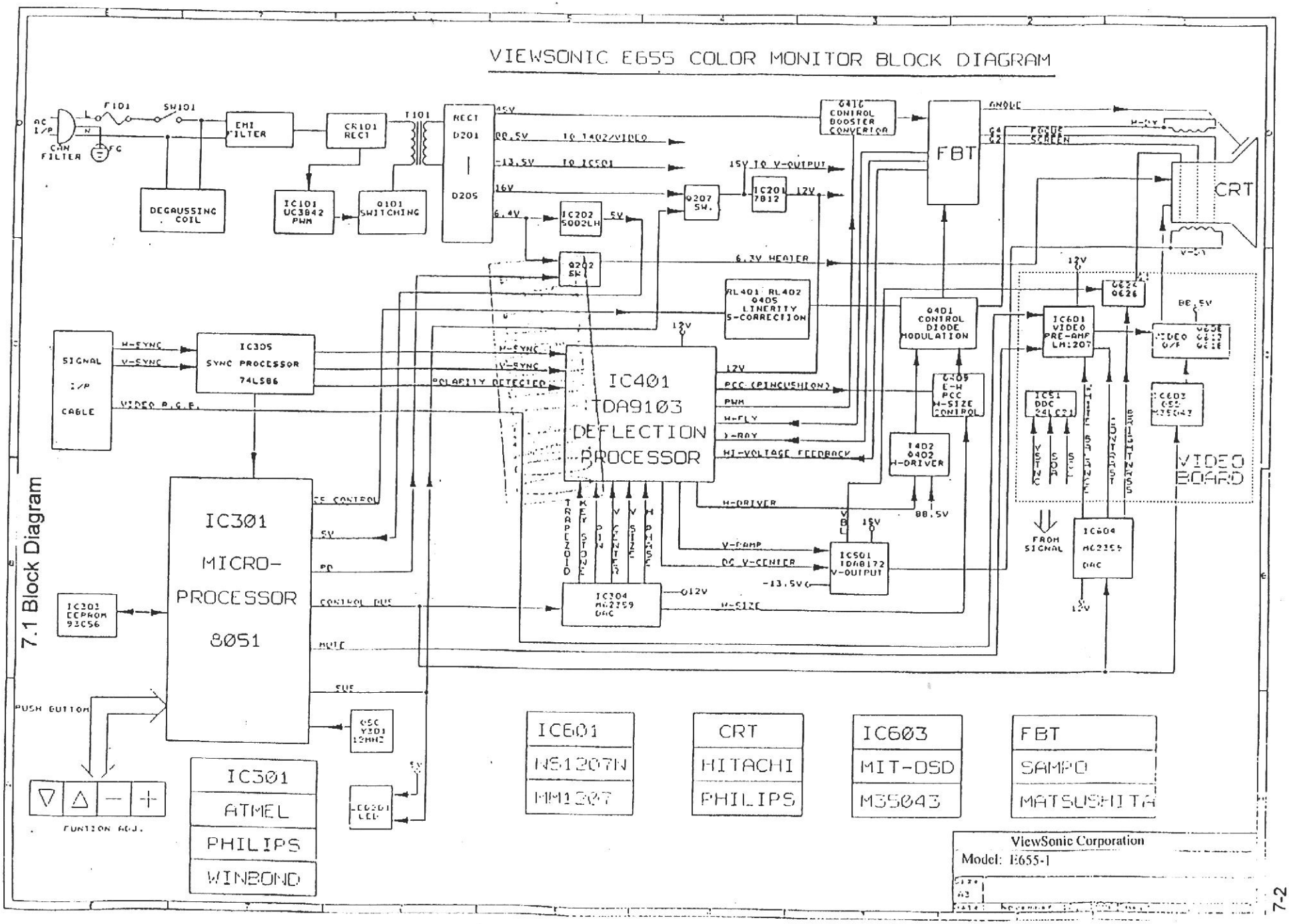
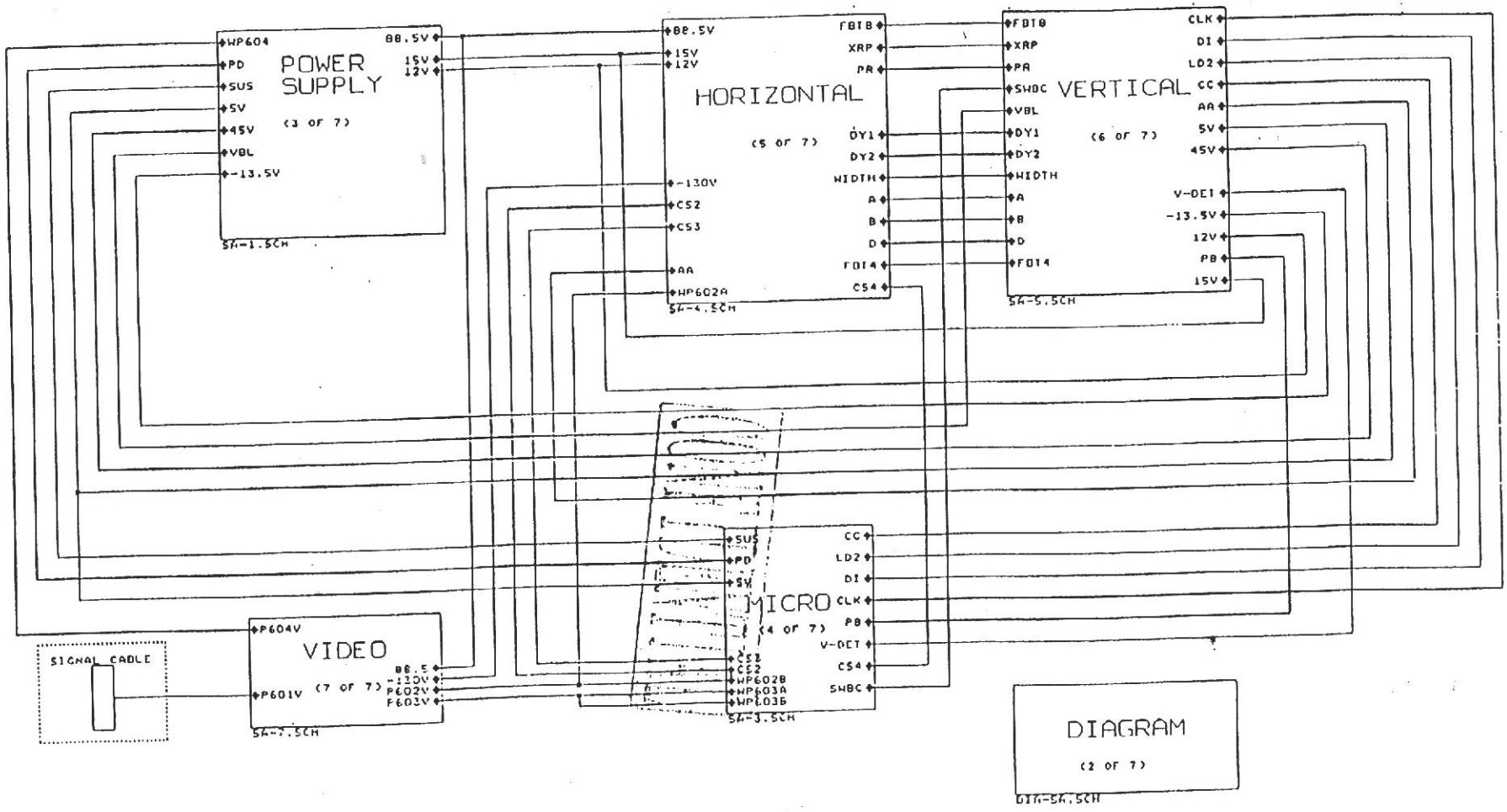
VIEWSONIC E655 COLOR MONITOR BLOCK DIAGRAM



7.1 Block Diagram

VIEWSONIC E655

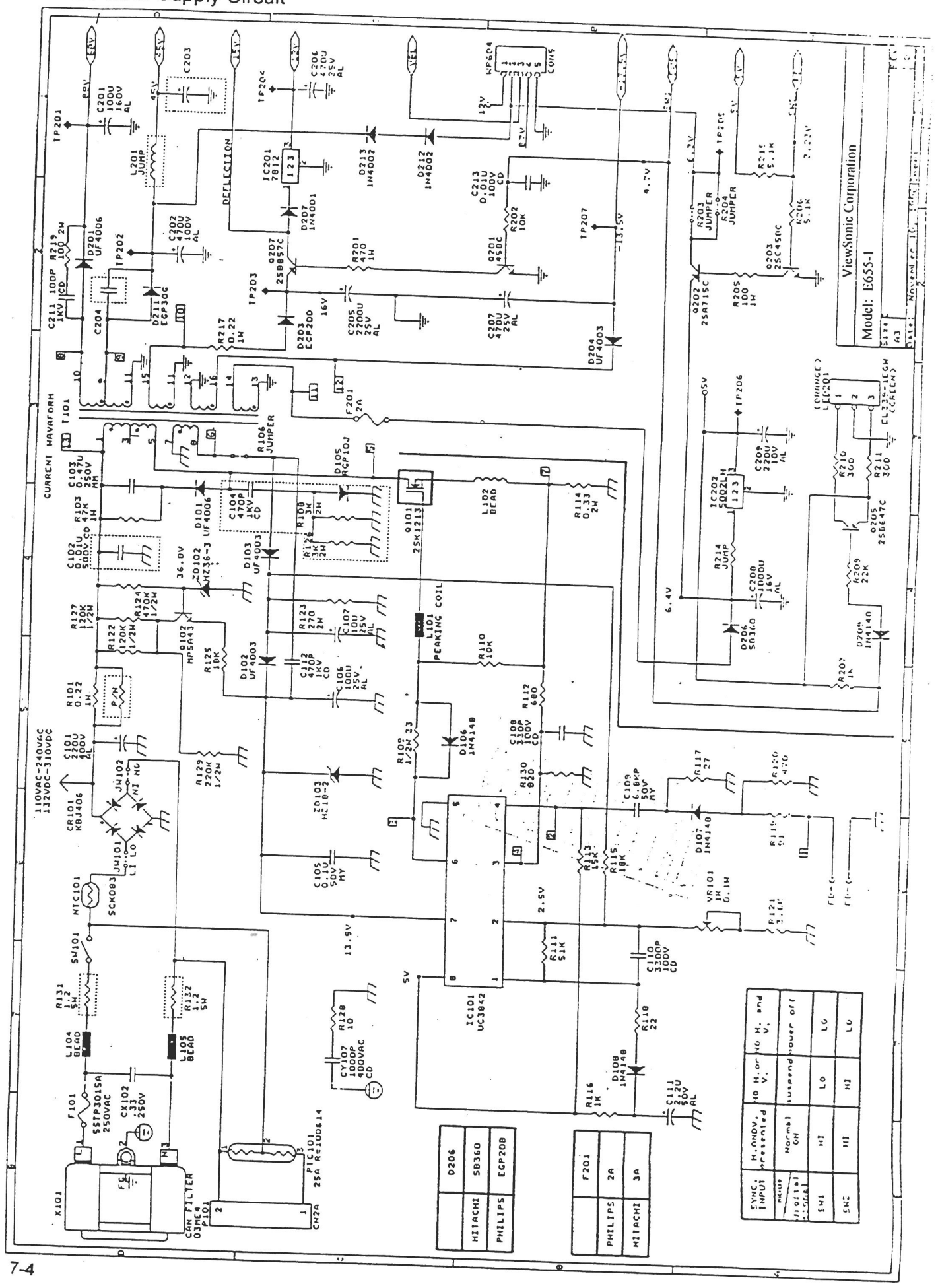


DRAWN BY	DATE 08/06/96"	REV: Ø
DESIGNED BY	DATE	CODE : Ø
APPROVED BY	DATE	

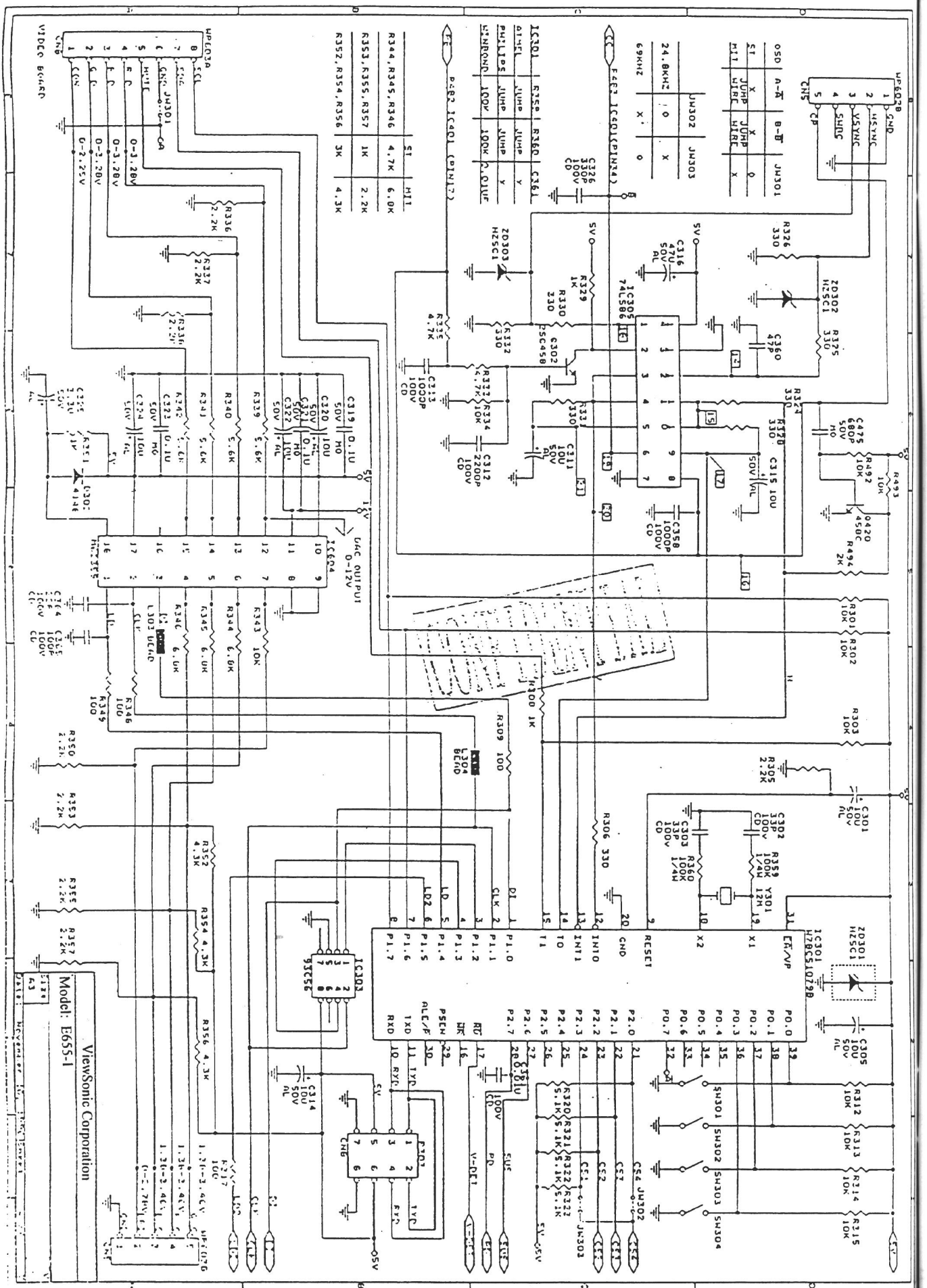
ViewSonic Corporation

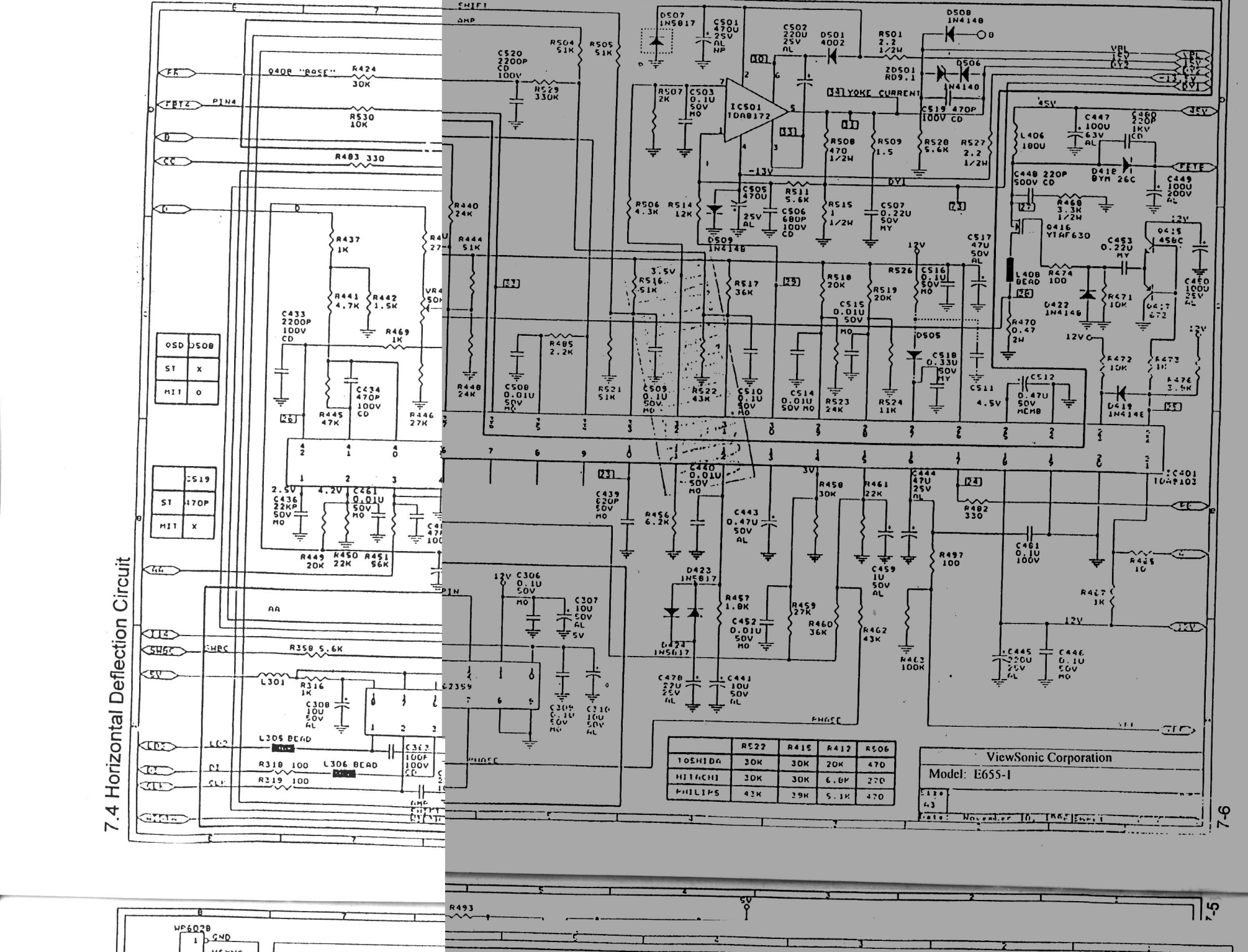
Model: E655-1

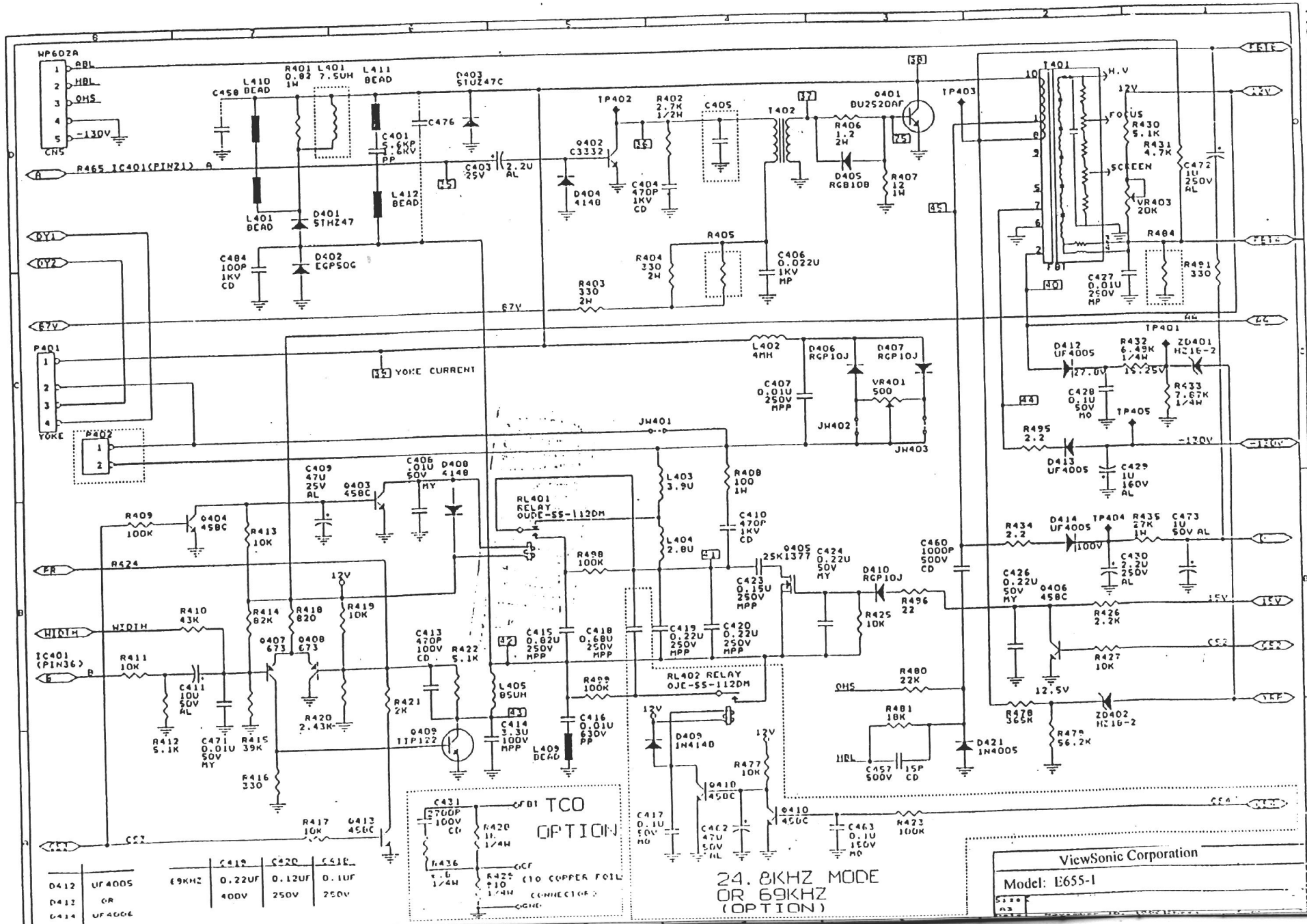
7.2 Power Supply Circuit

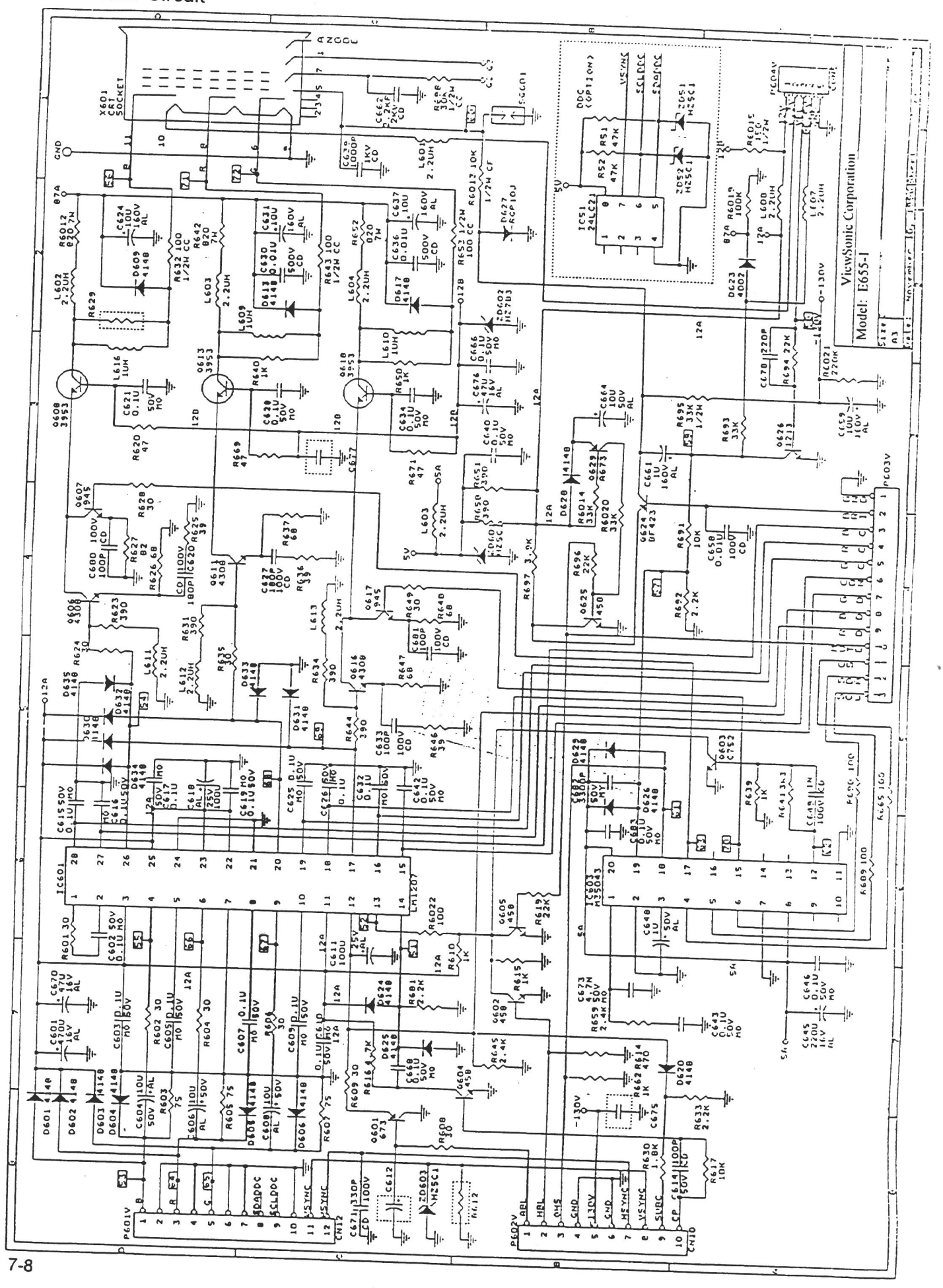


7.3 Micro-Controller Circuit




7.4 Horizontal Deflection Circuit
ViewSonic Corporation
Model: E655-1
TOSHIBA
HITACHI
PHILIPS
7-6
7-5


CN5
-130V
R465 IC401(PIN21)
L410 BEAD
R401 0.82 1W
L401 7.5UH
L411 BEAD
D403 S10Z47C
C458
C476
C401 5.6KP 1.6KV PP
C403 25V
2.2U AL
L412 BEAD
L401 BEAD
D401 STHZ47
C484 100P 1KV CD
D402 EGP50G
TP402
R402 2.7K 1/2W
C405
Q402 C3332
D404 4148
C404 470P 1KV CD
T402
Q401 BU2520AF
R406 1.2 2W
D405 RGP10B
R407 12 1W
R405
R404 330 2W
C406 0.022U 1KV MP
R403 330 2H
67V
TP403
T401
H.V
12V
FOCUS
R430 5.1K
R431 4.7K
SCREEN
VR403 20K
C472 1U 250V AL
R484
R491 330
C427 0.01U 250V MP
TP401
D412 UF4005
R432 6.49K 1/4W
ZD401 HZ16-2
27.0V
15.25V
C428 0.1U 50V MO
R433 7.67K 1/4W
TP405
R495 2.2
D413 UF4005
C429 1U 160V AL
P401
YOKE
P402
YOKE CURRENT
L402 4MH
D406 RGP10J
D407 RGP10J
C407 0.01U 250V MPP
VR401 500
JW402
JW403
JW401
C409 47U 25V AL
Q403 4558C
C406 .01U 50V MY
D408 4148
RL401 RELAY OJE-SS-112DM
L403 3.9U
L404 2.8U
R408 100 1W
C410 470P 1KV CD
R409 100K
Q404 4558C
R413 10K
R424
12V
R498 100K
C423 0.15U 250V MPP
Q405 2SK1377
C424 0.22U 50V MY
D410 RGP10J
R496 22
R425 10K
C460 1000P 500V CD
R434 2.2
D414 UF4005
TP404
R435 27K 1W
C473 1U 50V AL
C426 0.22U 50V MY
Q406 4558C
C430 2.2U 250V AL
R426 2.2K
15V
R427 10K
12.5V
R478 365K
ZD402 HZ16-2
R479 56.2K
R410 43K
WIDTH
R414 82K
R418 820
R419 10K
Q407 673
Q408 673
C413 470P 100V CD
R422 5.1K
C415 0.82U 250V MPP
C418 0.68U 250V MPP
C419 0.22U 250V MPP
C420 0.22U 250V MPP
IC401 (PIN36)
R411 10K
C411 10U 50V AL
R412 5.1K
C471 0.01U 50V MY
R415 39K
R416 330
R420 2.43K
R421 2K
Q409 TIP122
L405 85UH
C414 3.3U 100V MPP
L409 BEAD
R499 100K
C416 0.01U 630V PP
RL402 RELAY OJE-SS-112DM
OHS
R480 22K
R481 18K
HBL
C457 500V 15P CD
D421 1N4005
D409 1N4148
R477 10K
Q410 4558C
C417 0.1U 50V MO
C462 47U 50V AL
C463 0.1U 150V MO
R423 100K
R417 10K
Q413 4558C
C431 2700P 100V CD
R428 1K 1/4W
R436 5.6 1/4W
R429 10 1/4W
TCO OPTION
(TO COPPER FOIL CONNECTOR)
24.8KHZ MODE OR 69KHZ (OPTION)
D412 UF4005
D413 OR
D414 UF4006
69KHZ
C419 0.22UF 400V
C420 0.12UF 250V
C418 0.1UF 250V
ViewSonic Corporation
Model: E655-1

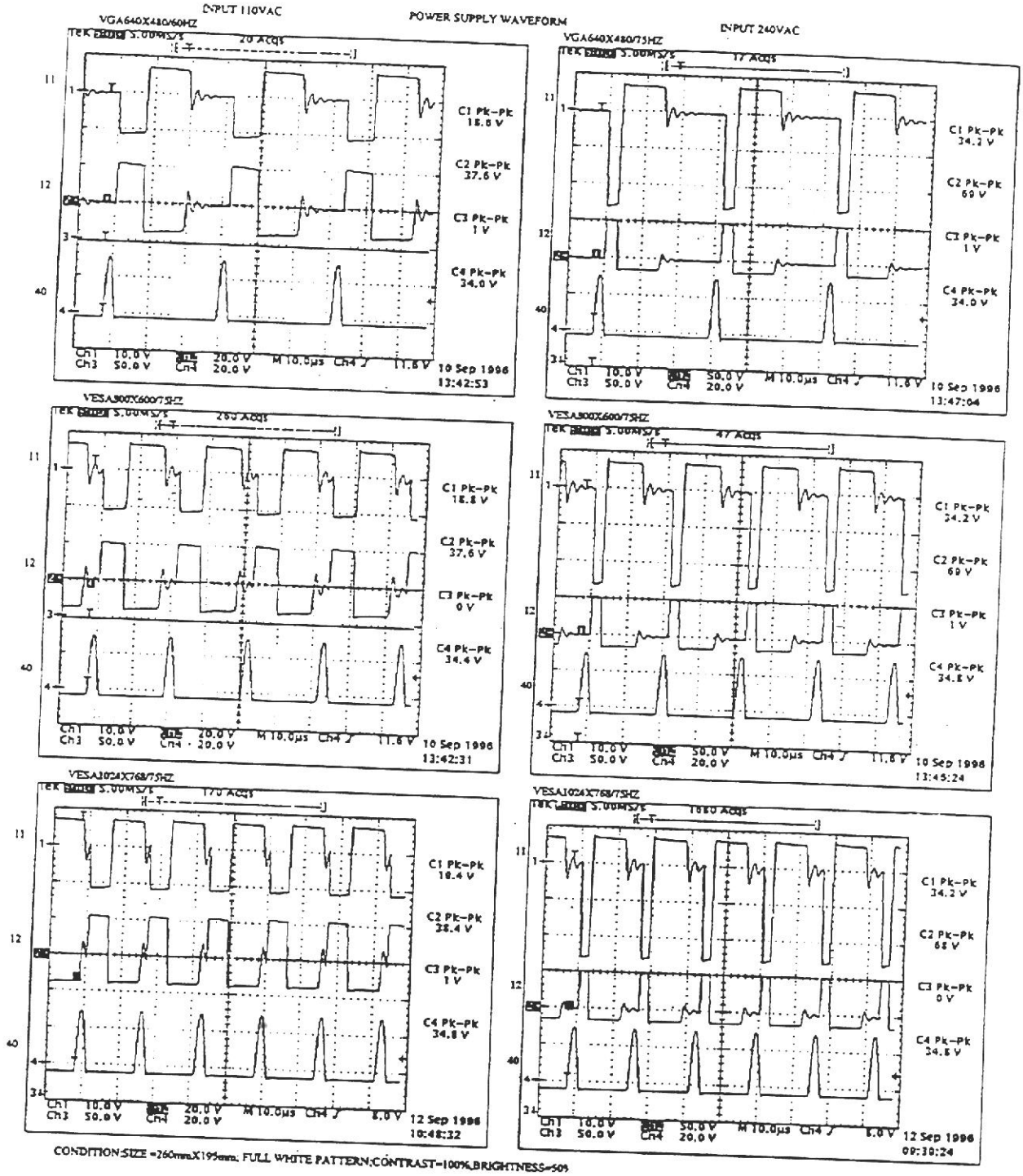

ViewSonic Corporation
Model: E655-1

Chapter 8

WAVEFORMS

8. WAVEFORMS 8-1
8.1 Power Supply Waveform 8-2
8.2 Horizontal & Vertical Sync. Polarity Waveform 8-7
8.3 Horizontal Deflection Waveform 8-8
8.4 Vertical Deflection Waveform 8-14
8.5 Video Waveform 8-15

8.1 Power Supply Waveform



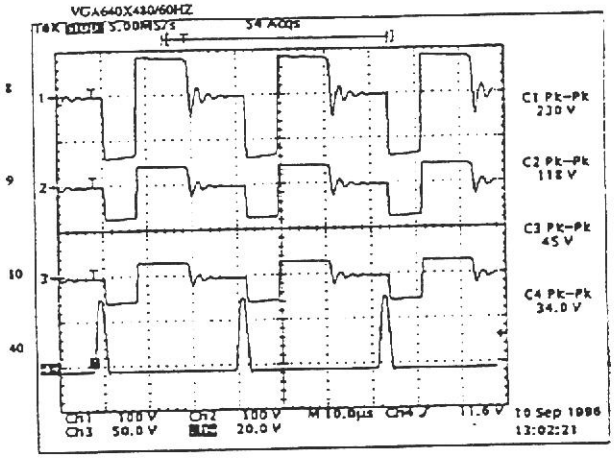
CONDITION:SIZE =260mmX195mm; FULL WHITE PATTERN;CONTRAST=100%,BRIGHTNESS=50%

INPUT 110VAC

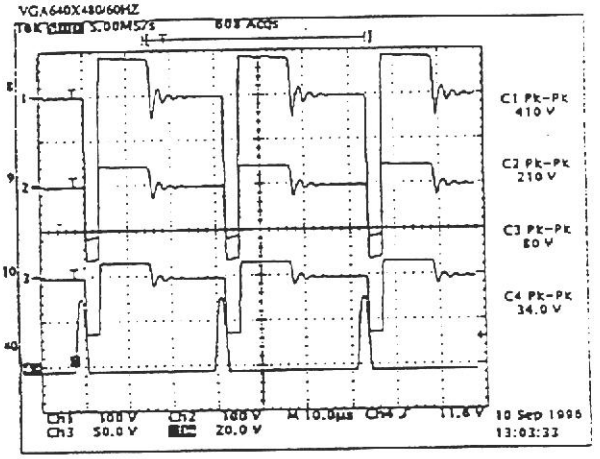
POWER SUPPLY WAVEFORM

INPUT 240VAC

VGA640X480/60HZ



VGA640X480/60HZ



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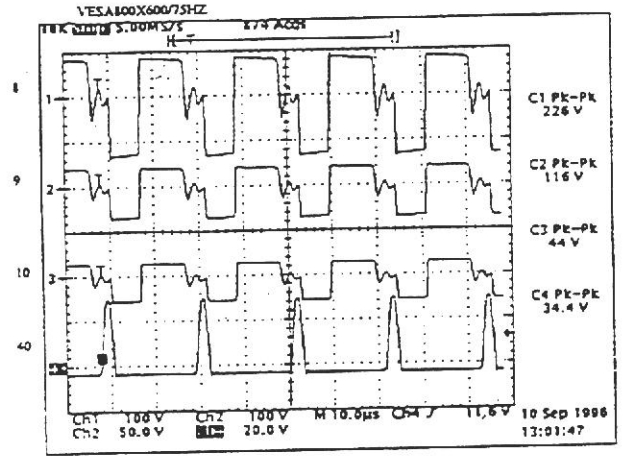

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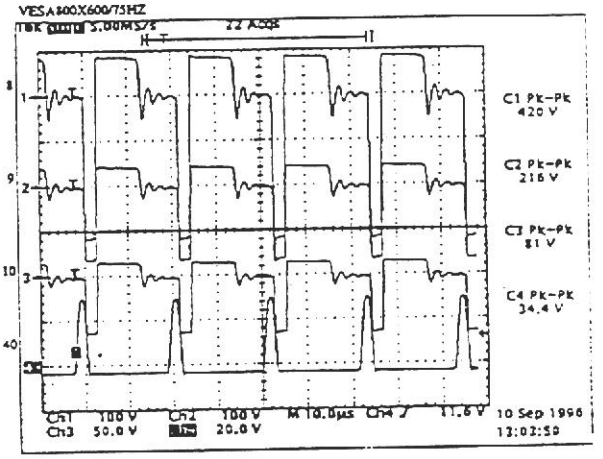

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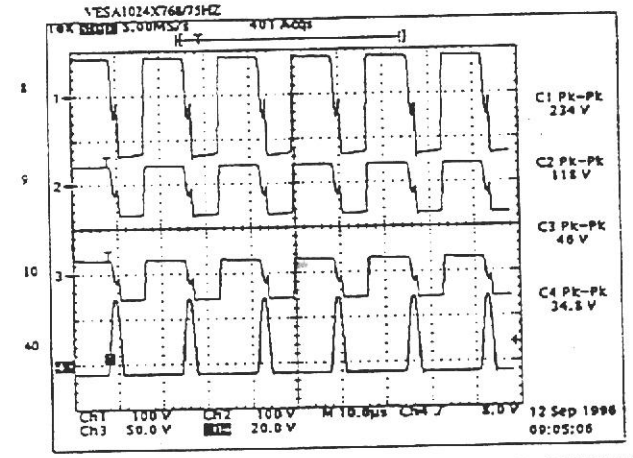
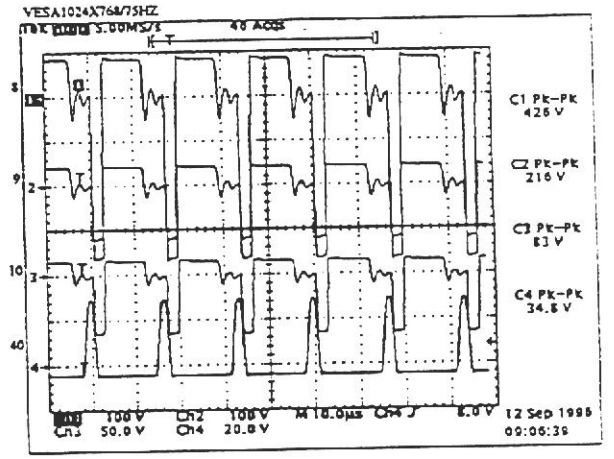


VESA1024X768/75HZ



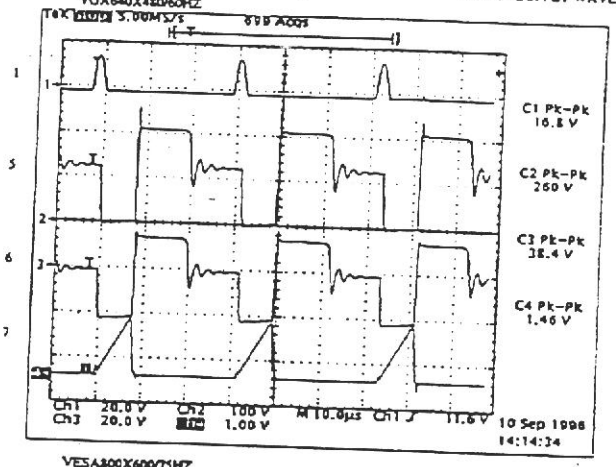
CONDITION:SIZE =260mmX195mm; FULL WHITE PATTERN;CONTRAST=100%,BRIGHTNESS=50%

INPUT 110VAC

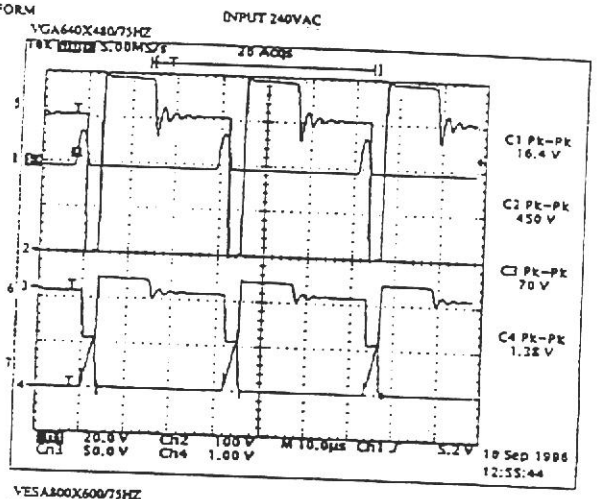
POWER SUPPLY WAVEFORM

INPUT 240VAC

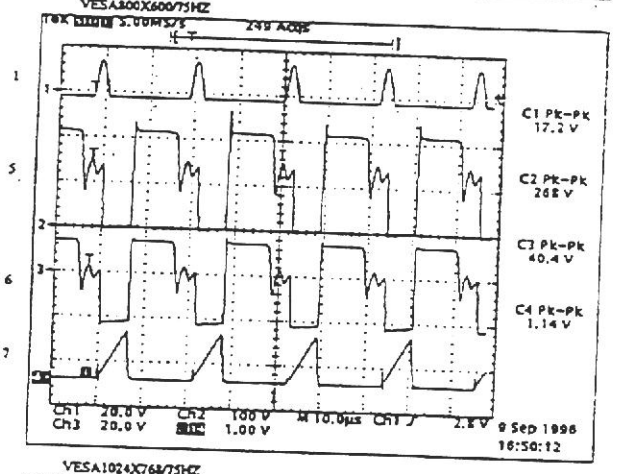
VGA640X480/60HZ



VGA640X480/75HZ



VESA800X600/75HZ



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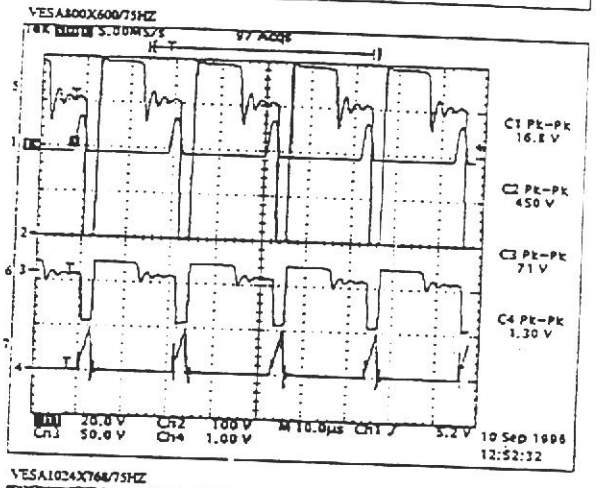

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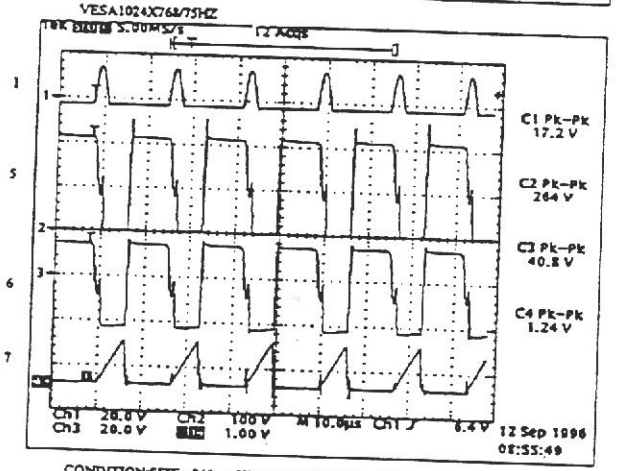

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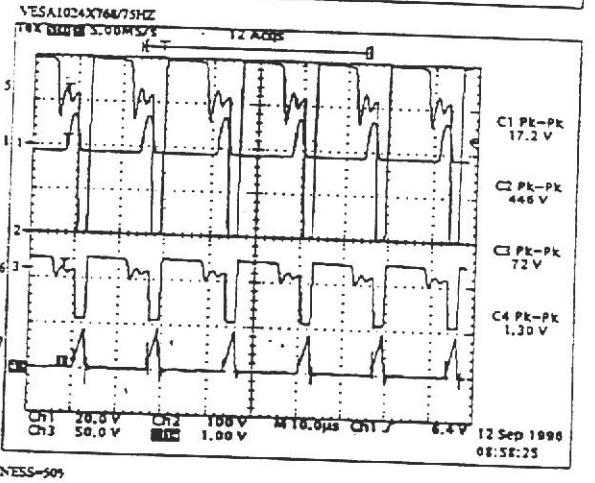
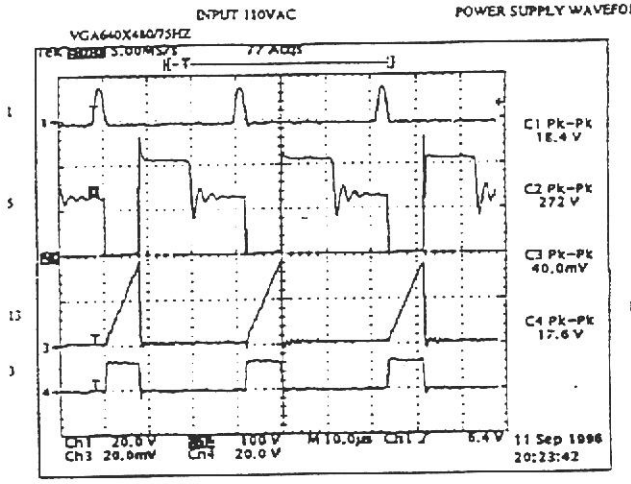


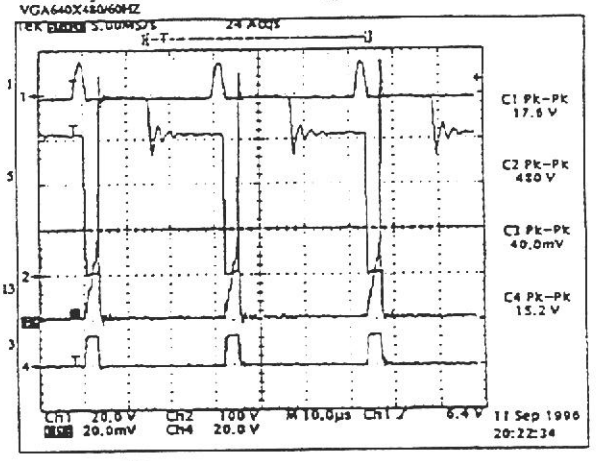
CONDITION:SIZE =260mmX195mm; FULL WHITE PATTERN;CONTRAST=100%,BRIGHTNESS=50%

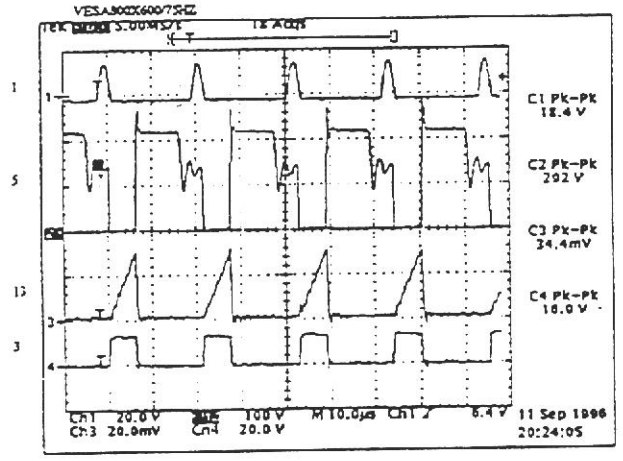
INPUT 110VAC

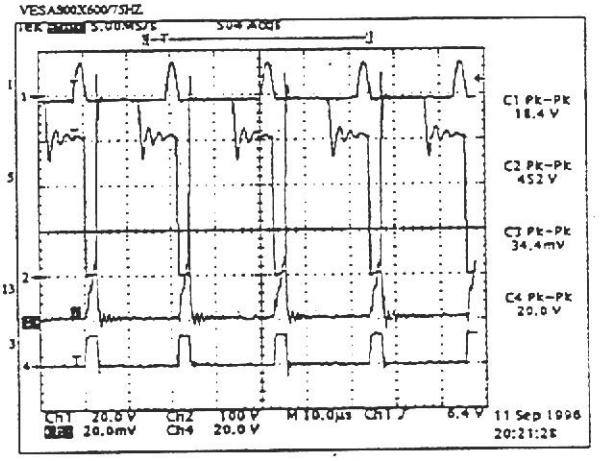
POWER SUPPLY WAVEFORM

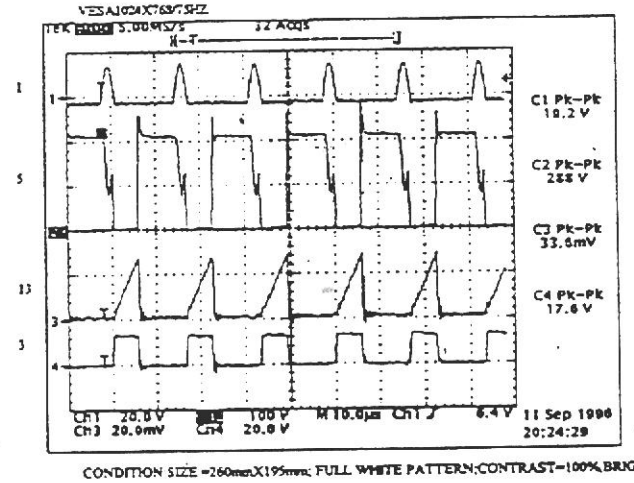
INPUT 240VAC

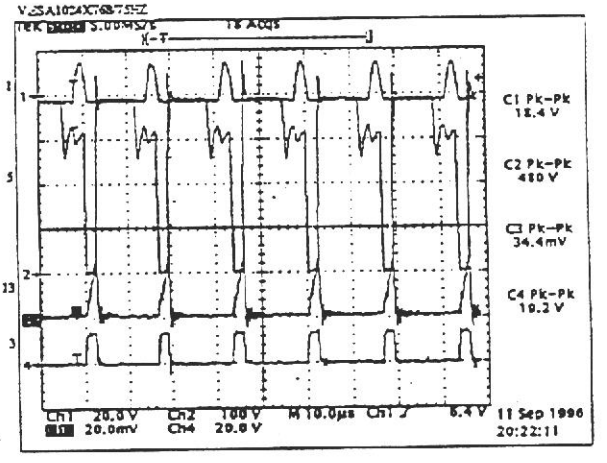










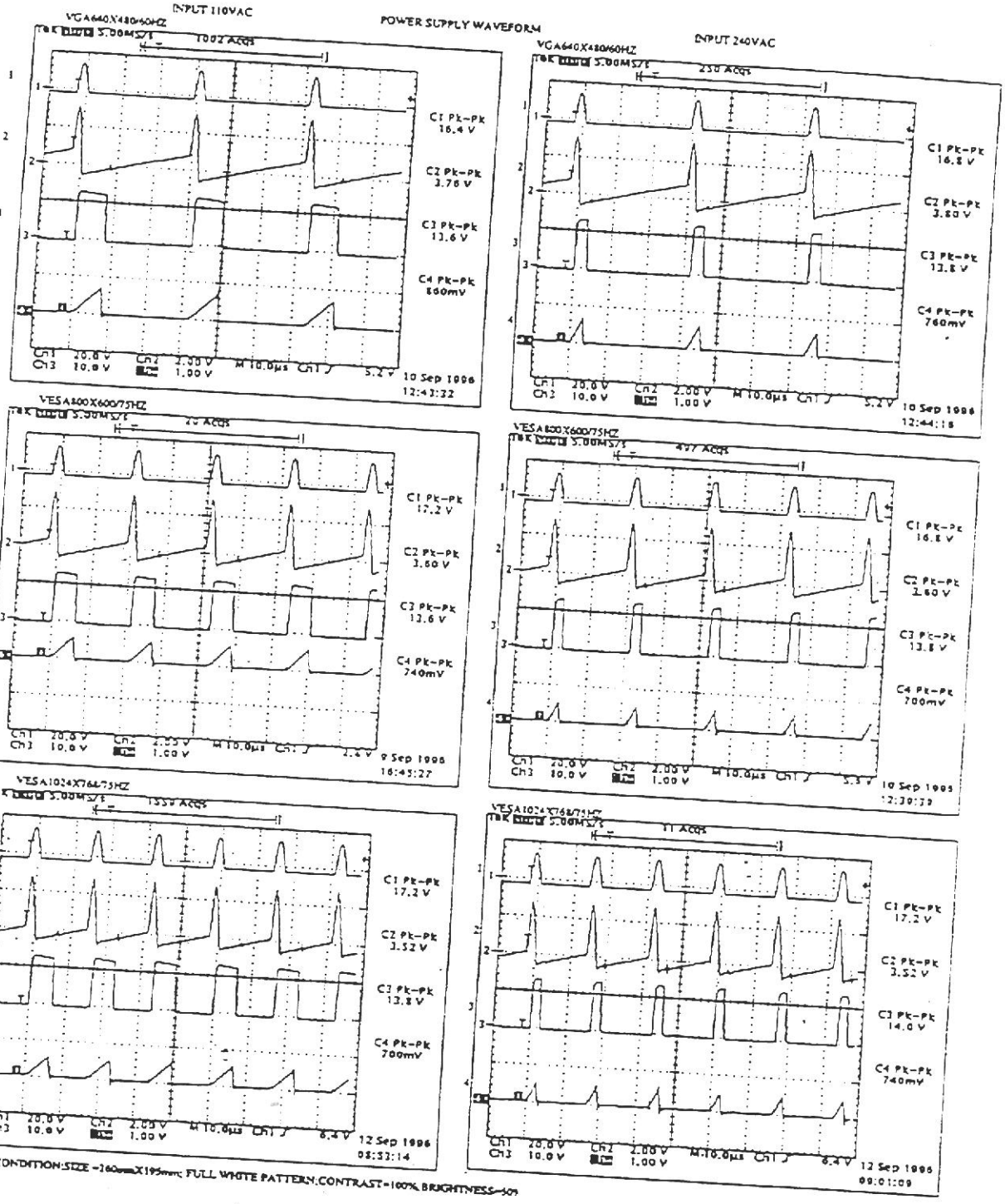


CONDITION SIZE =260mmX195mm; FULL WHITE PATTERN;CONTRAST=100%,BRIGHTNESS=50%

INPUT 110VAC

POWER SUPPLY WAVEFORM

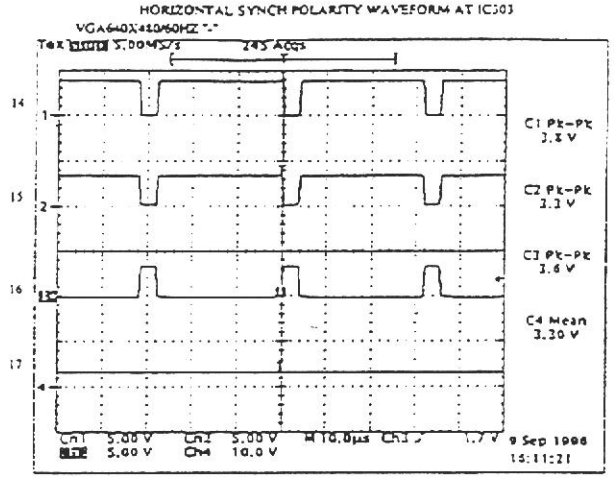
INPUT 240VAC



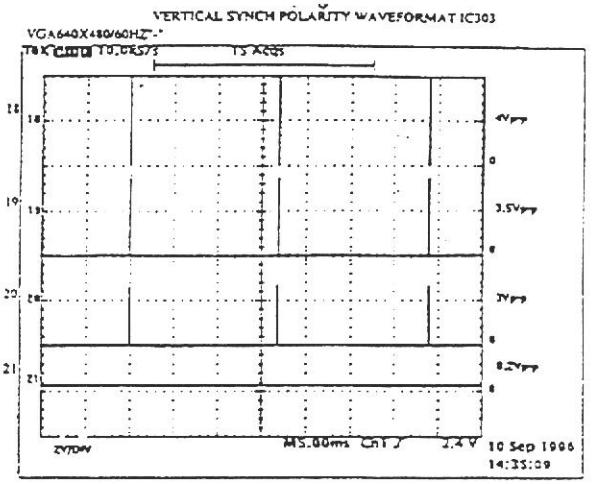
CONDITION:SIZE =160mmX195mm; FULL WHITE PATTERN,CONTRAST=100% BRIGHTNESS=50%

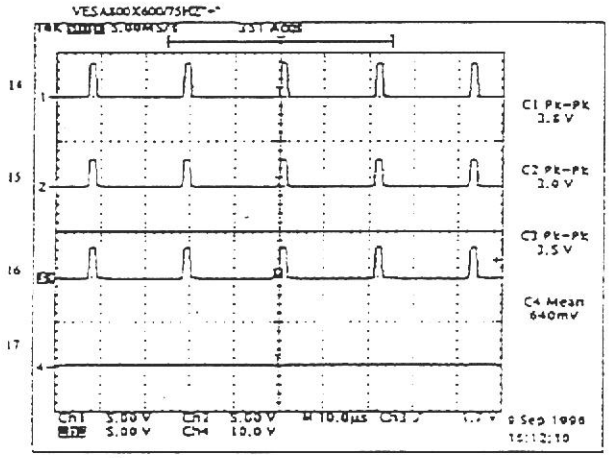
8.2 Horizontal & Vertical Sync. Polarity Waveform

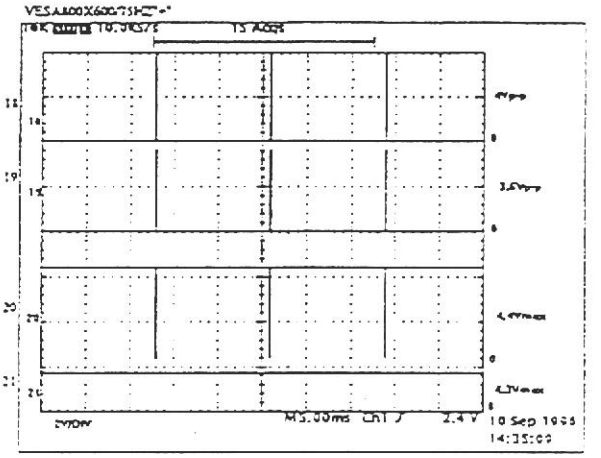
HORIZONTAL SYNCH POLARITY WAVEFORM AT IC303

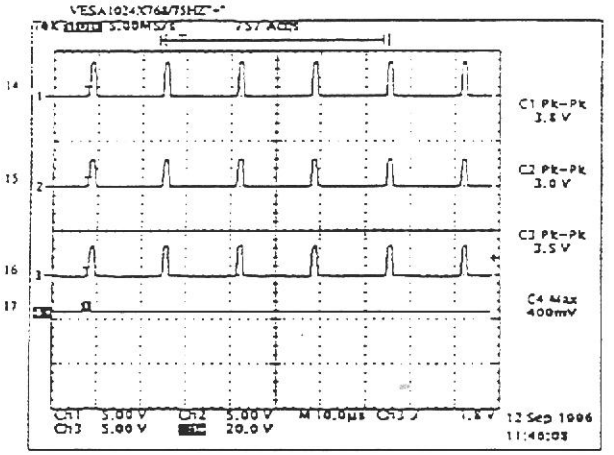


VERTICAL SYNCH POLARITY WAVEFORMAT IC303



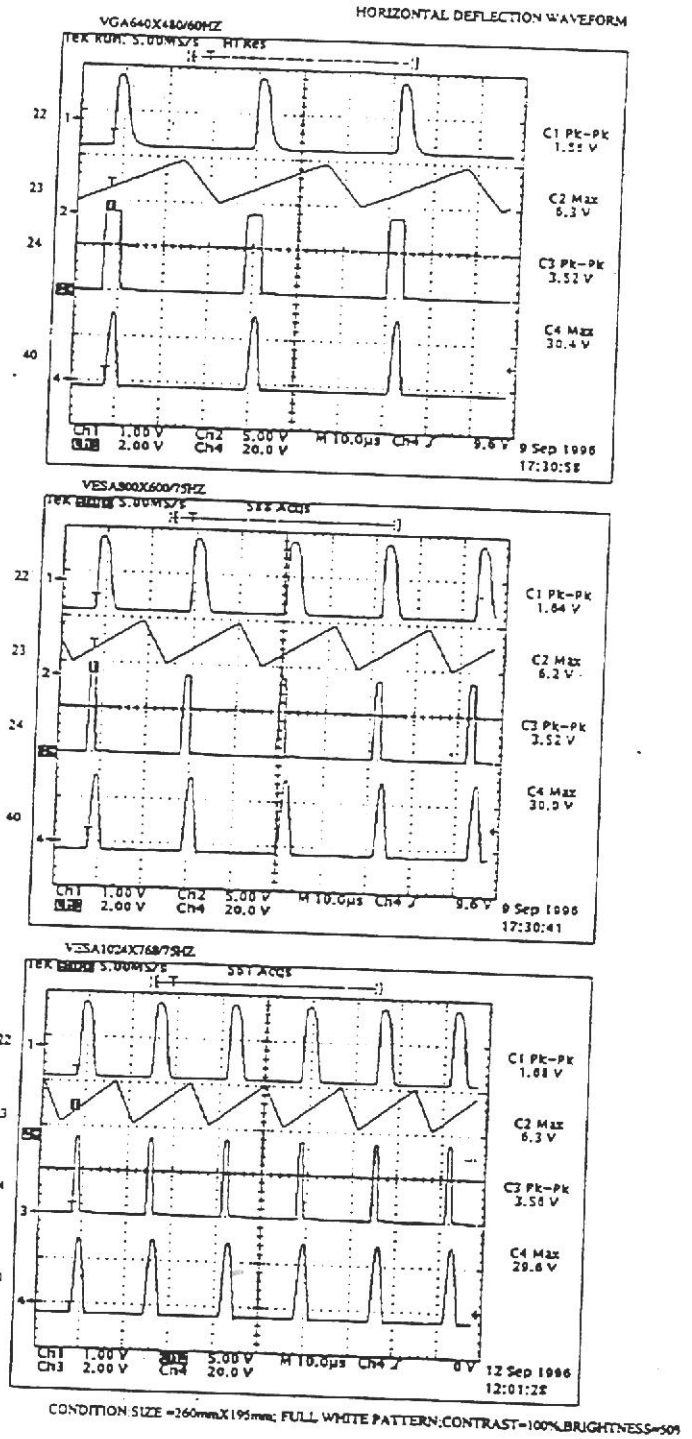




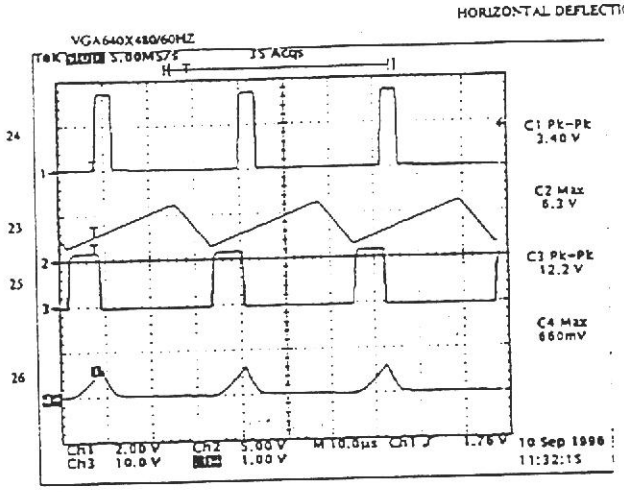


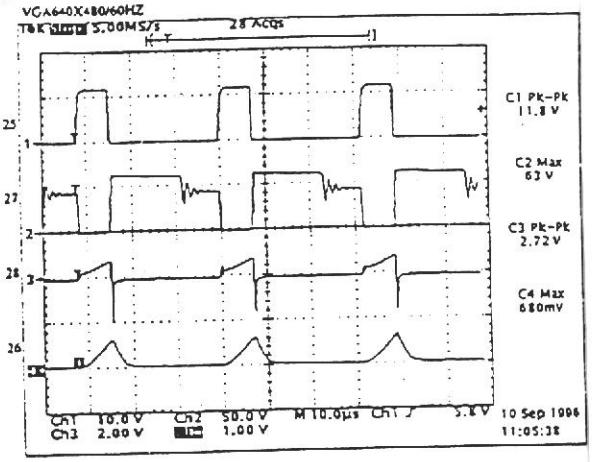
CONDITION:SIZE =160mmX195mm; FULL WHITE PATTERN;CONTRAST=100%,BRIGHTNESS=50%

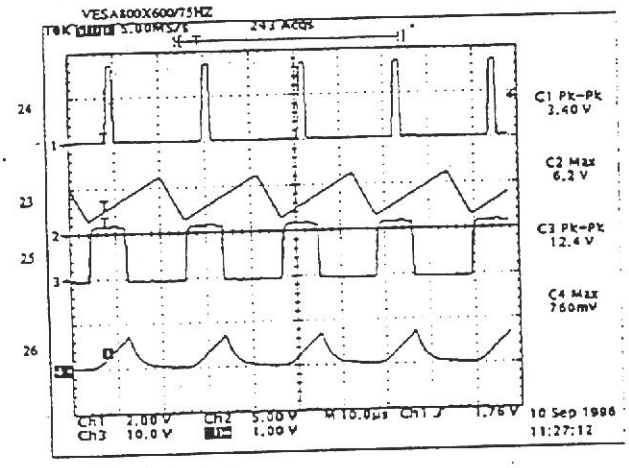
8.3 Horizontal Deflection Waveform

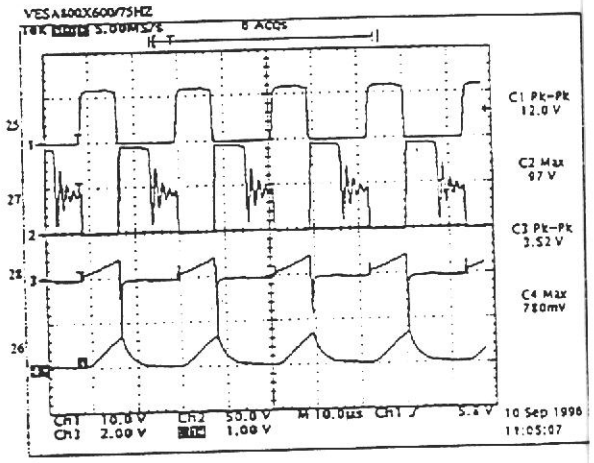


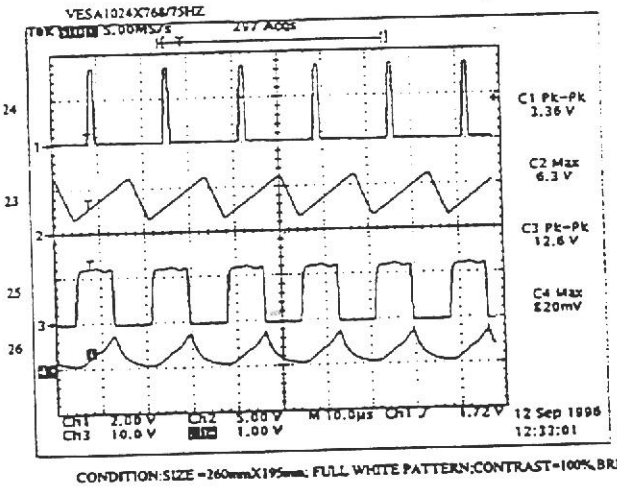
HORIZONTAL DEFLECTION WAVE FORM

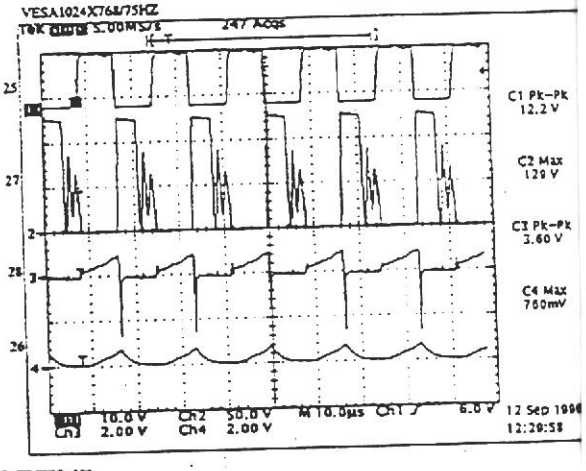






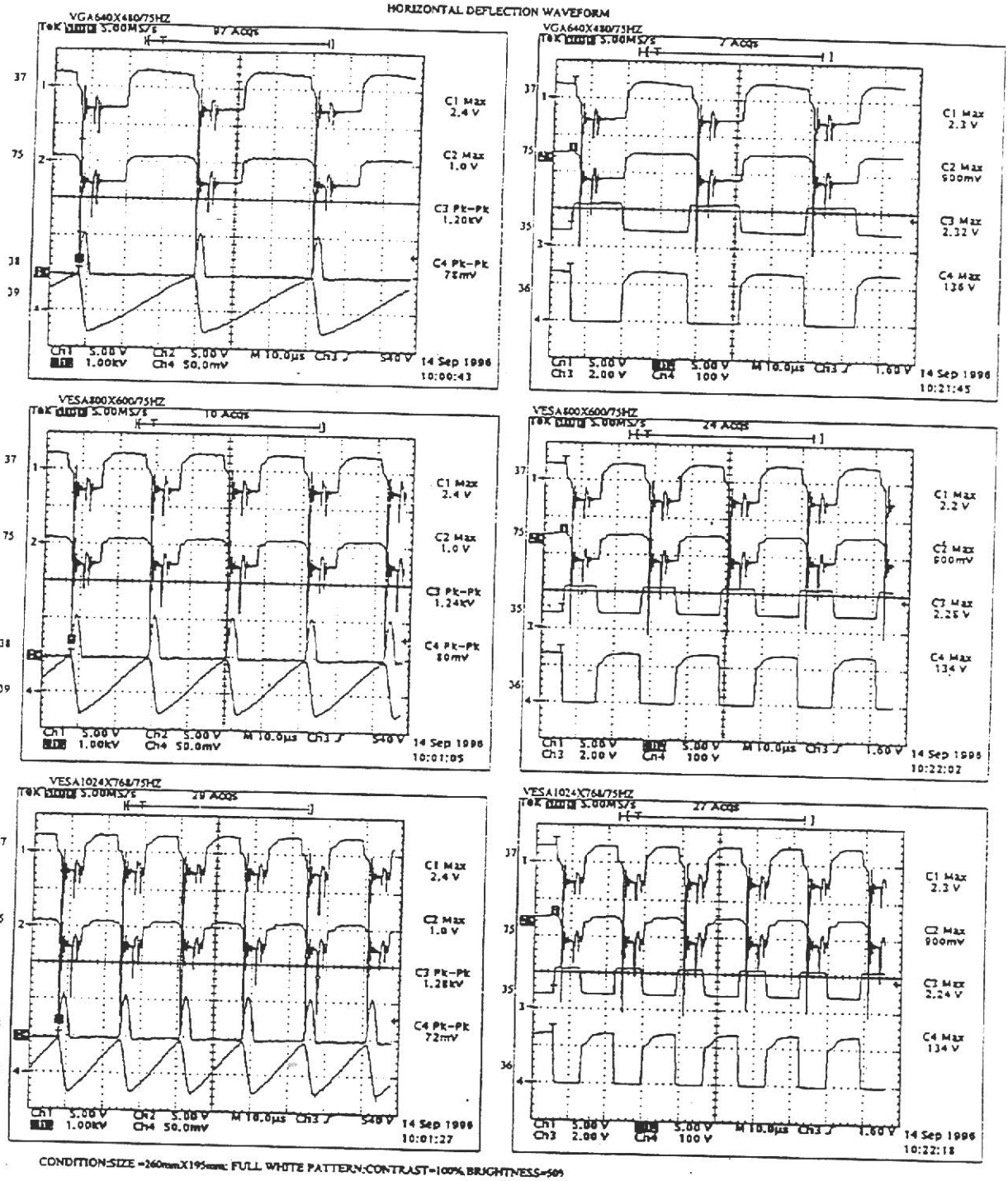






CONDITION:SIZE =260mmX195mm; FULL WHITE PATTERN;CONTRAST=100%,BRIGHTNESS=50%

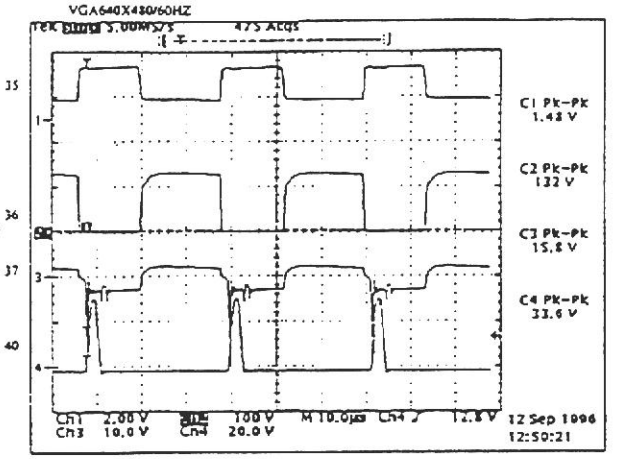
HORIZONTAL DEFLECTION WAVEFORM



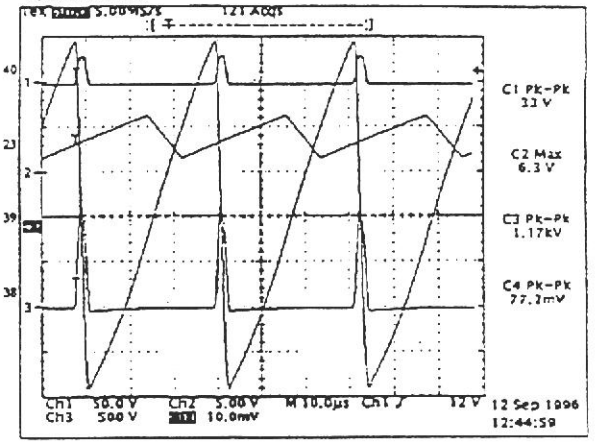
CONDITION:SIZE =260mmX195mm; FULL WHITE PATTERN;CONTRAST=100%,BRIGHTNESS=50%

HORIZONTAL DEFLECTION DIODE MODULATION WAVEFORM

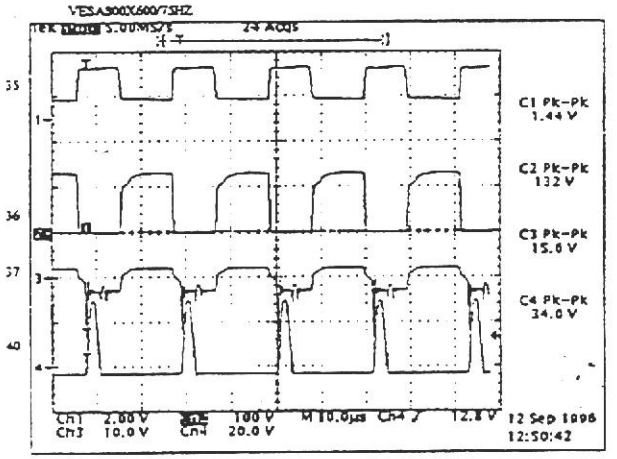
VGA640X480/60HZ



VGA640X480/60HZ



VESA800X600/75HZ



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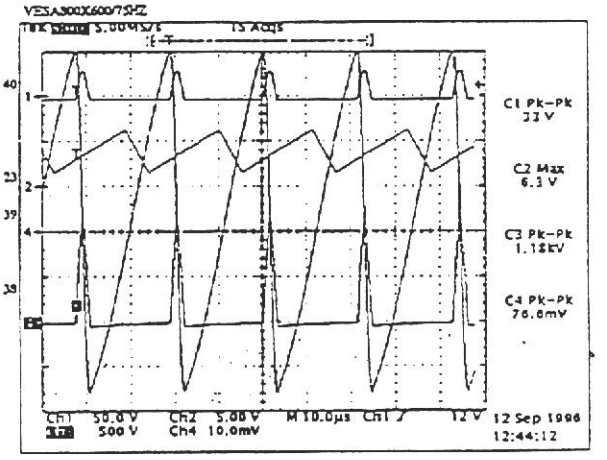

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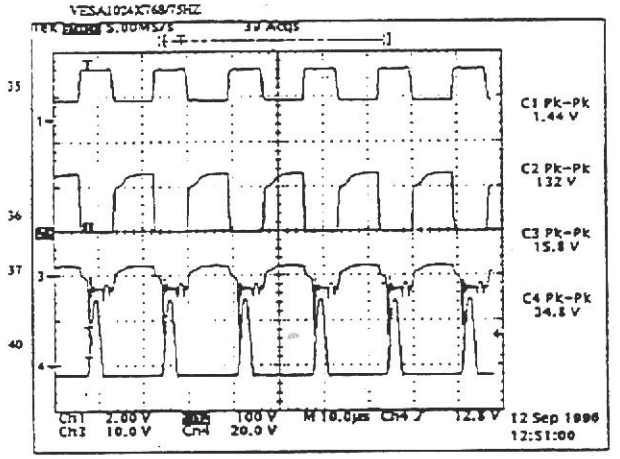
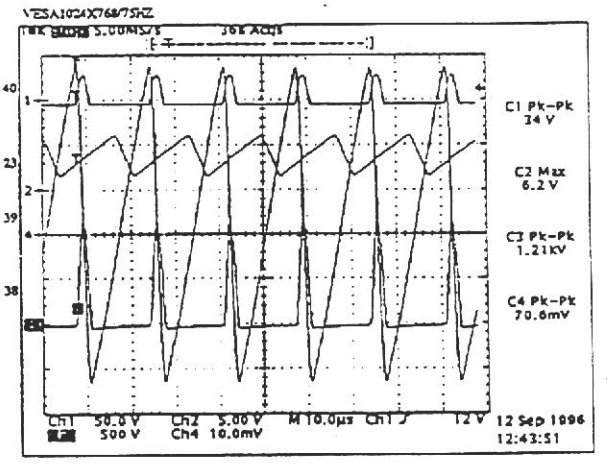
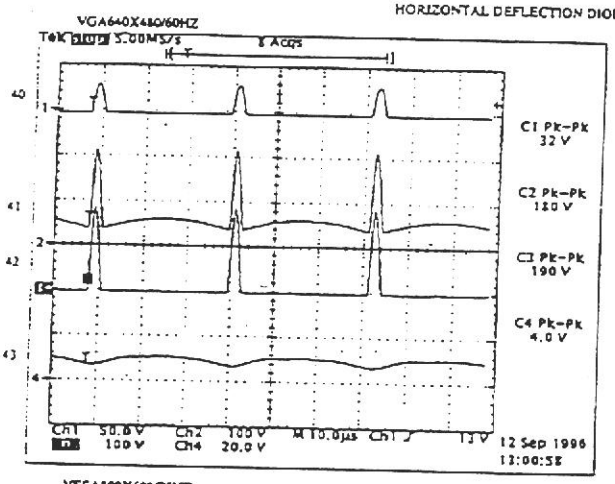


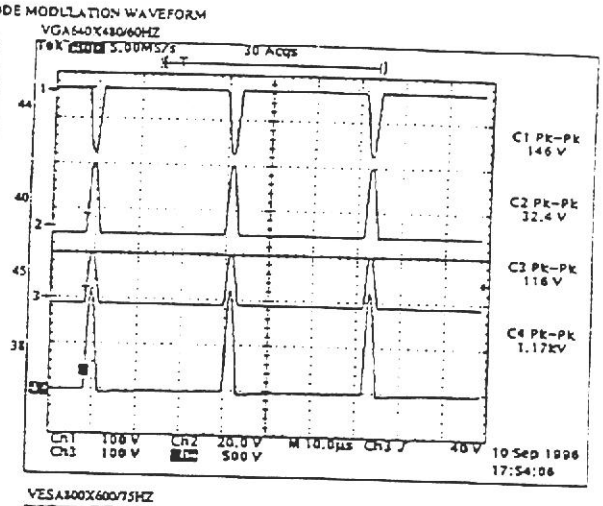
VESA1024X768/75HZ

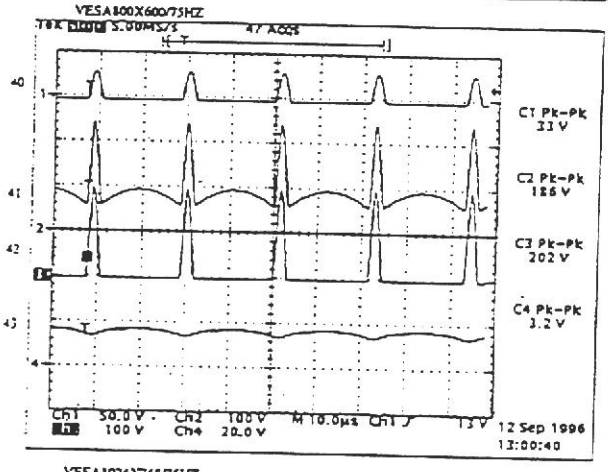


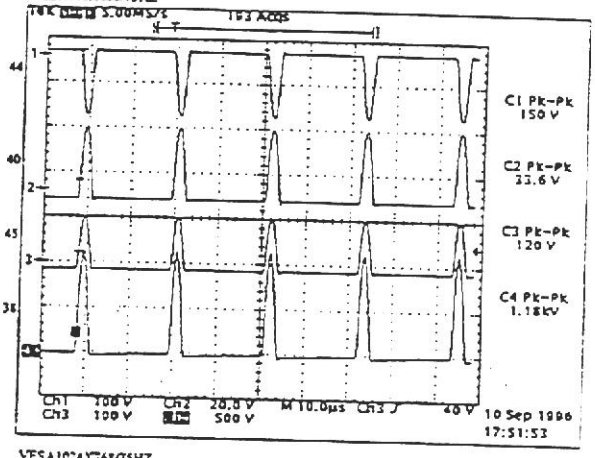
CONDITION:SIZE =260mmX195mm; FULL WHITE PATTERN;CONTRAST=100%,BRIGHTNESS=50%

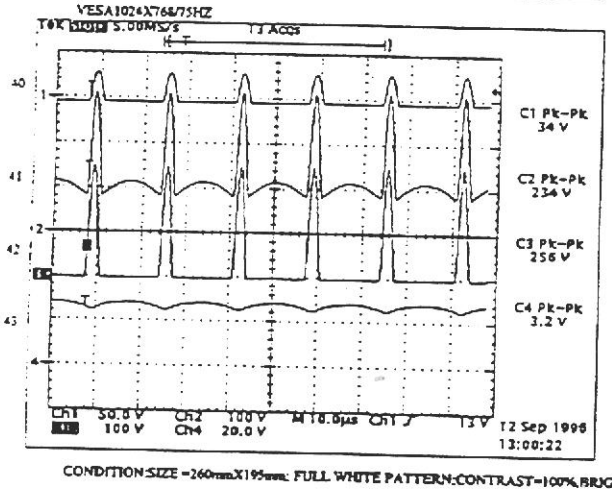
HORIZONTAL DEFLECTION DIODE MODULATION WAVEFORM

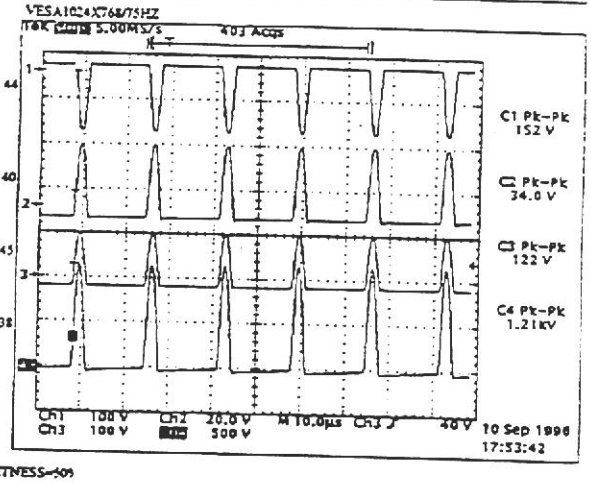






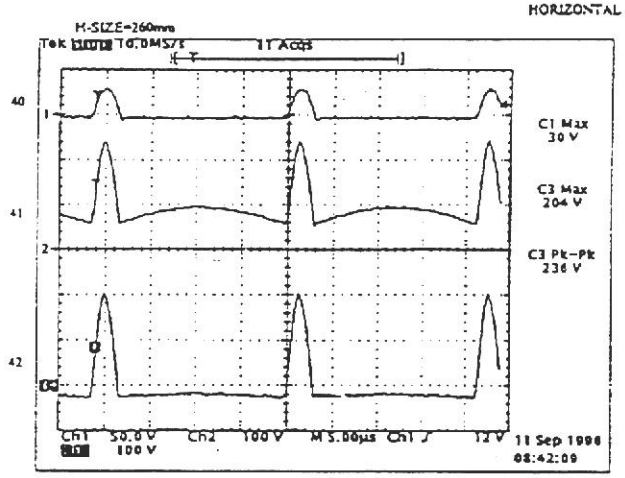


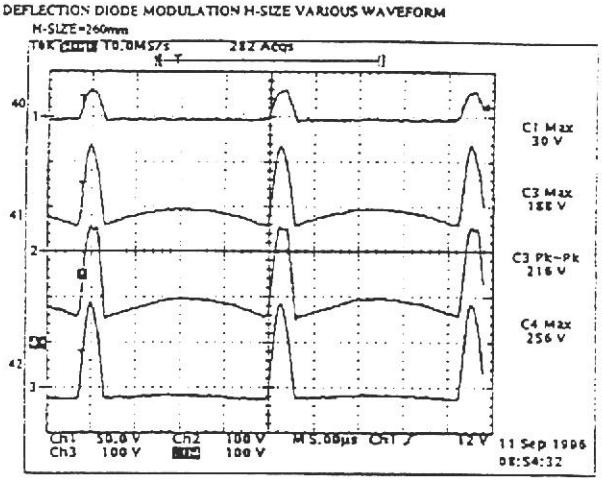


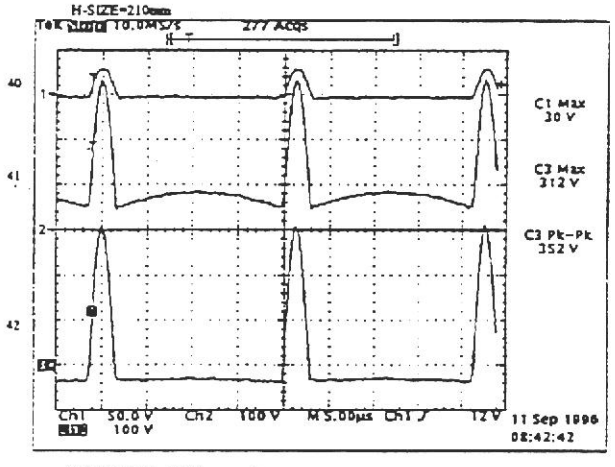


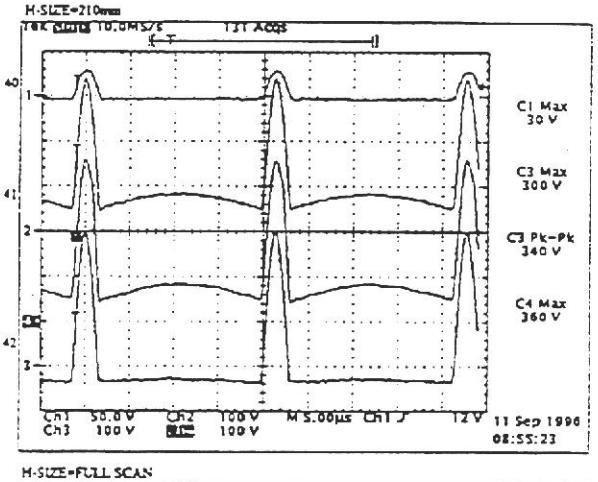
CONDITION:SIZE =260mmX195mm; FULL WHITE PATTERN;CONTRAST=100%,BRIGHTNESS=50%

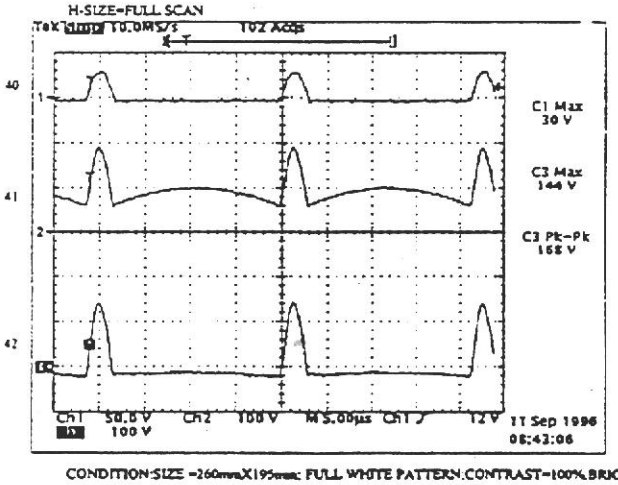
HORIZONTAL DEFLECTION DIODE MODULATION H-SIZE VARIOUS WAVEFORM

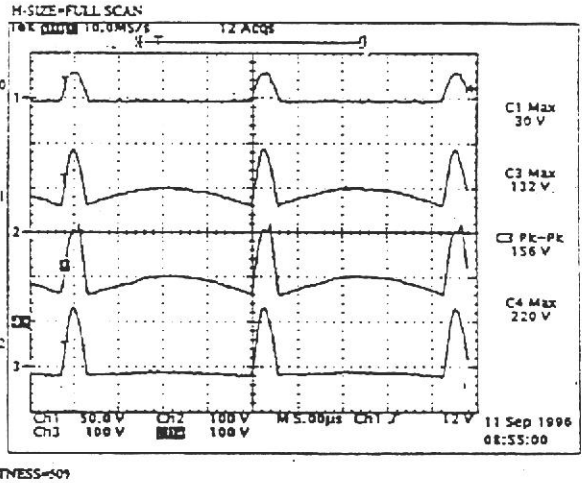






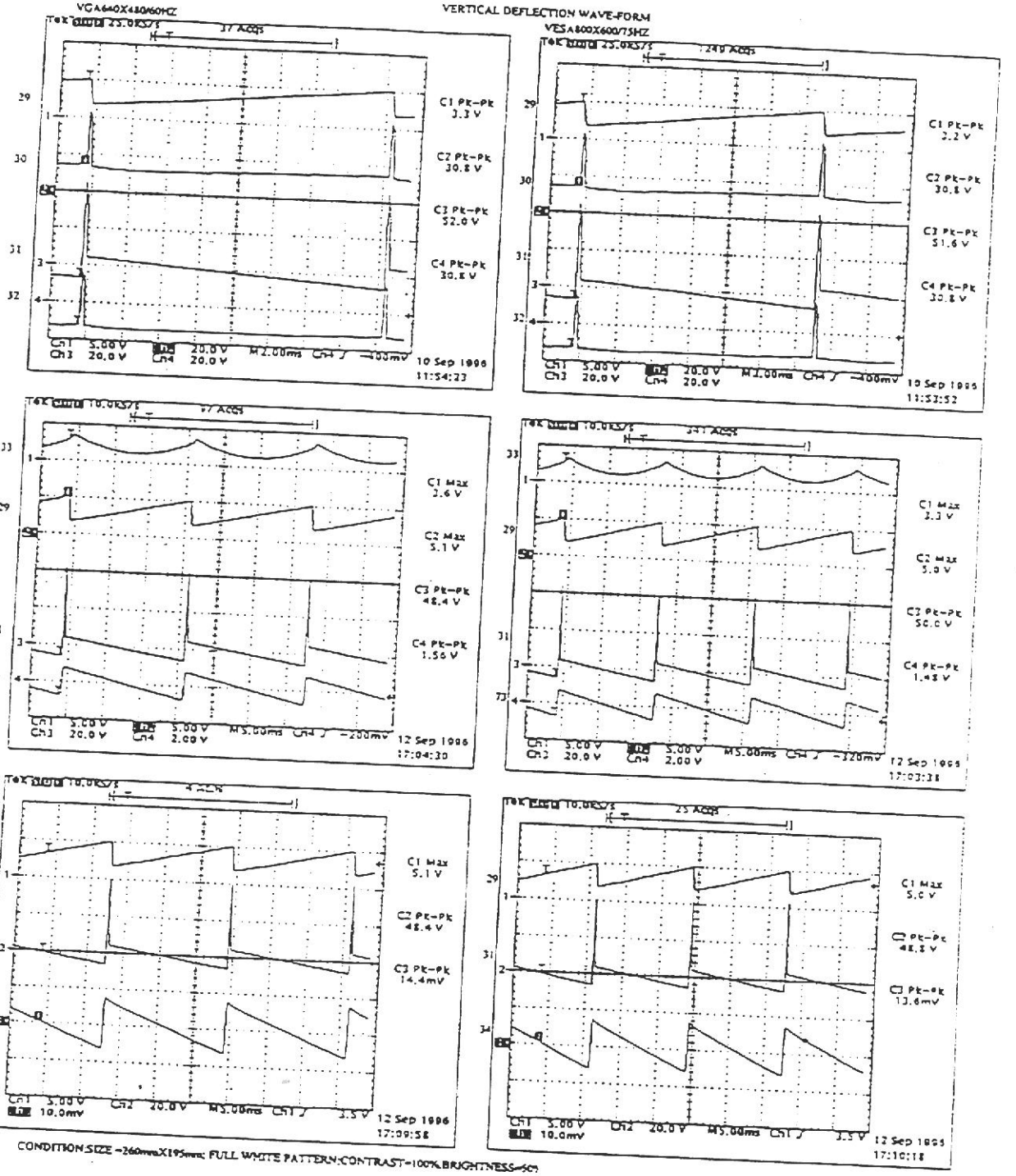






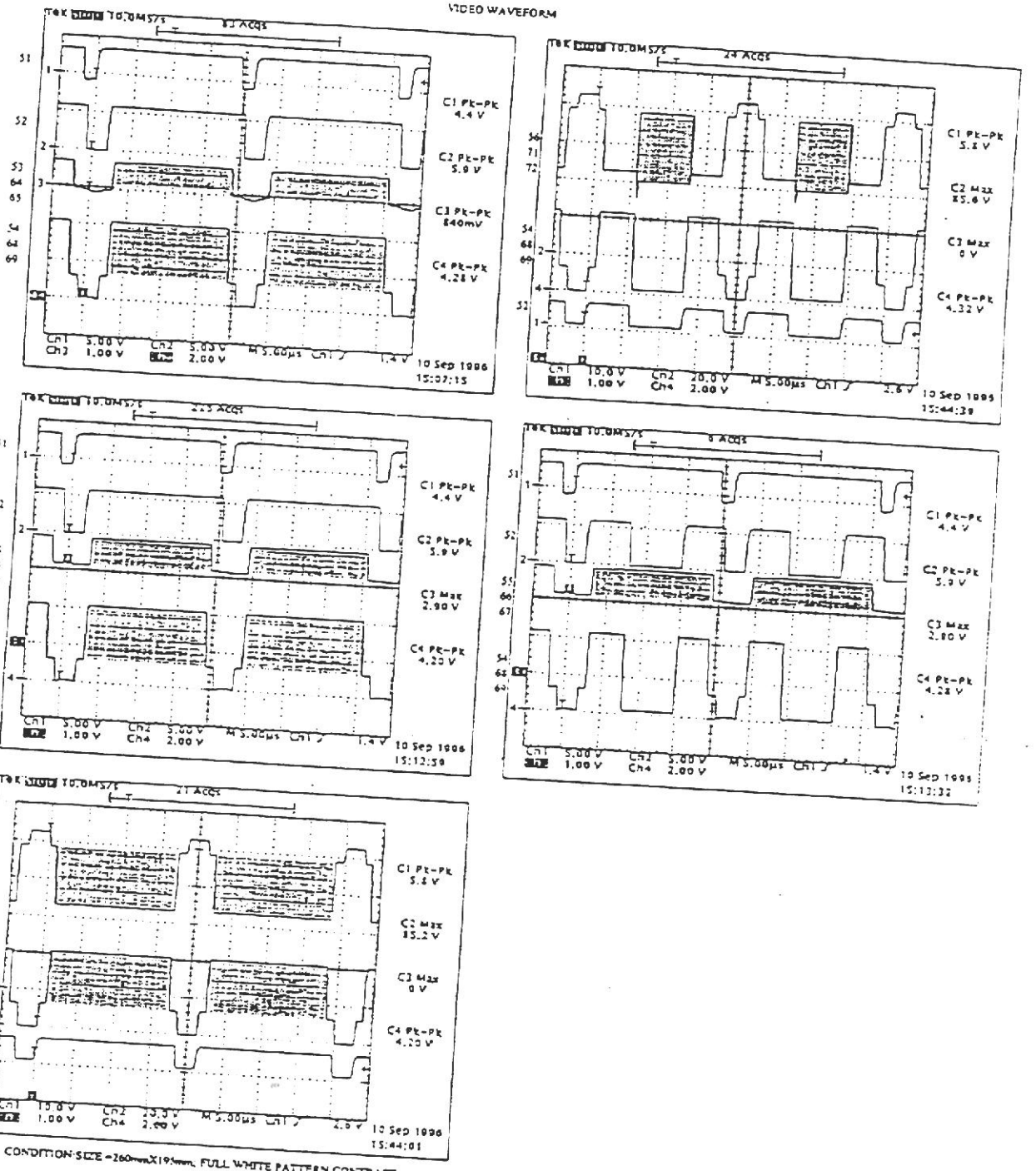
CONDITION:SIZE =260mmX195mm: FULL WHITE PATTERN:CONTRAST=100%,BRIGHTNESS=50%

8.4 Vertical Deflection Waveform



8.5 Video Waveform

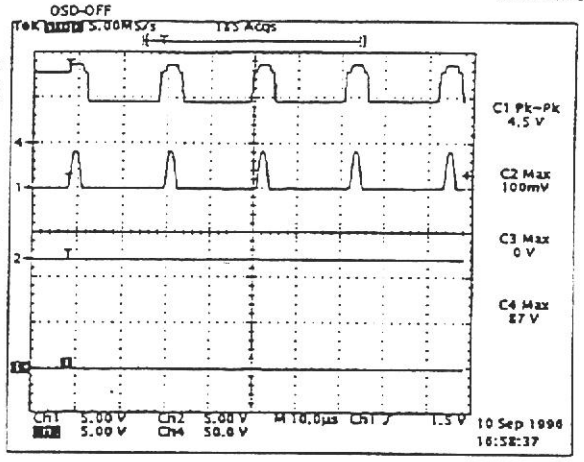
VIDEO WAVEFORM



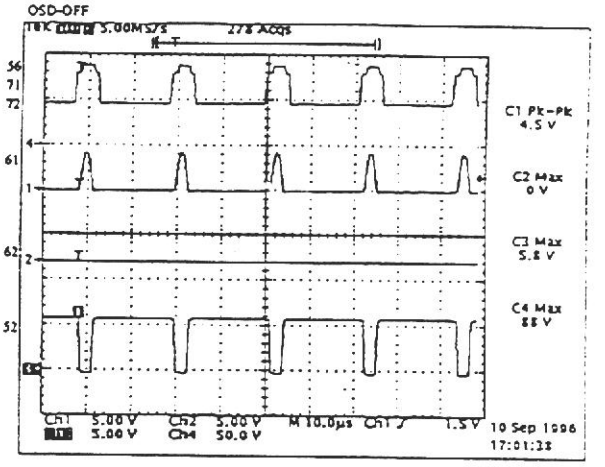
CONDITION:SIZE=260mmX195mm, FULL WHITE PATTERN,CONTRAST=100%,BRIGHTNESS=50%

VIDEO WAVEFORM

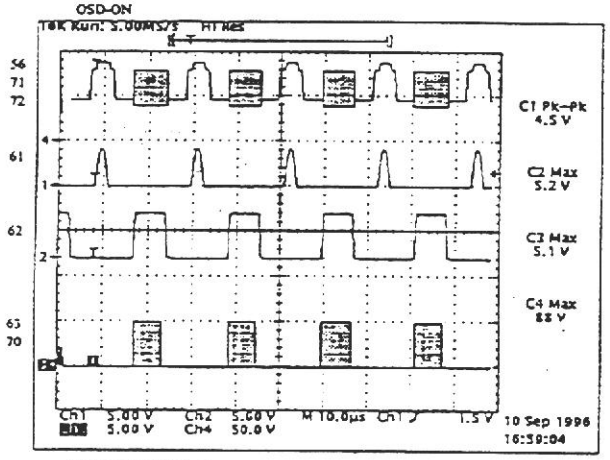
OSD-OFF



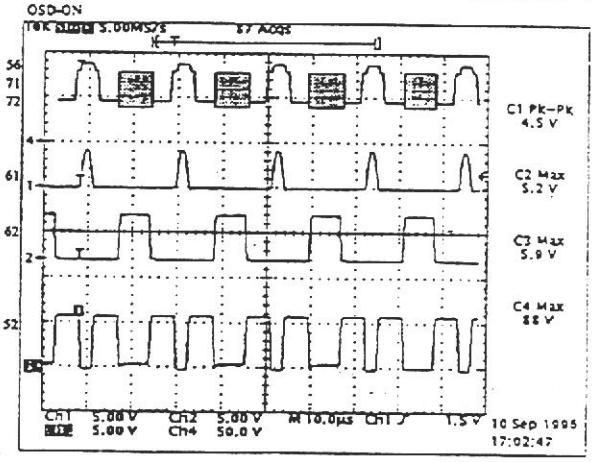
OSD-OFF



OSD-ON

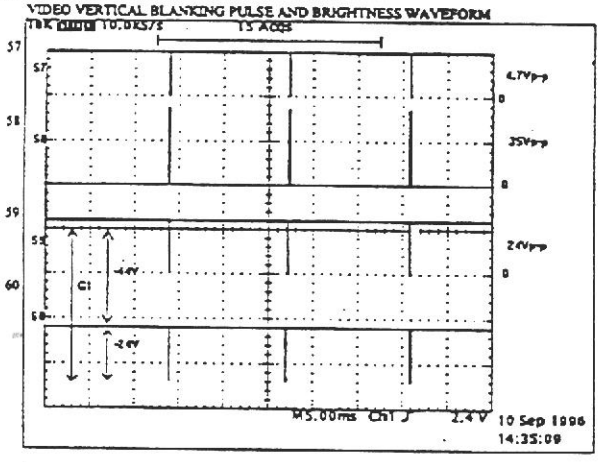


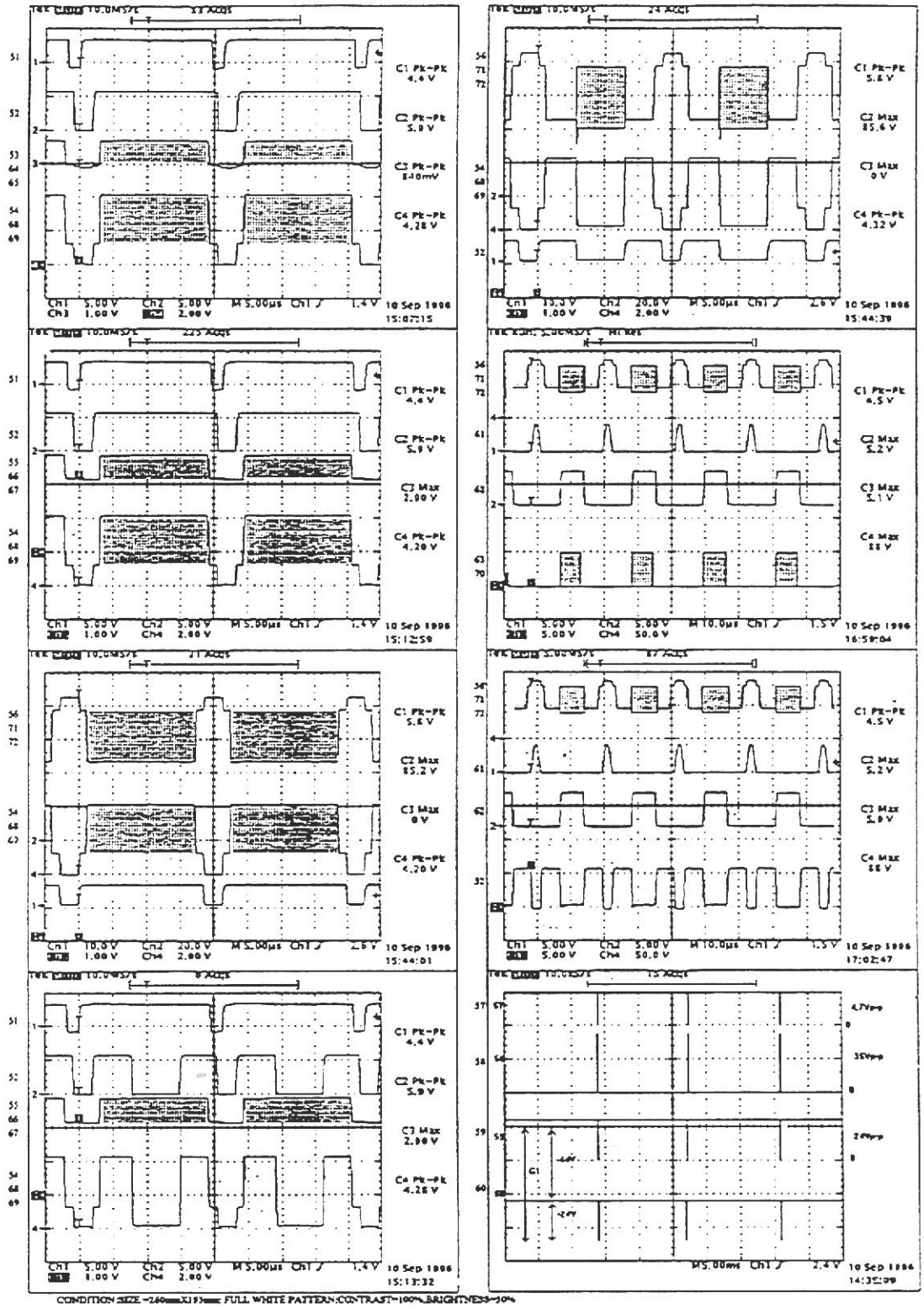
OSD-ON



CONDITION:SIZE =260mmX195mm; FULL WHITE PATTERN;CONTRAST=100%,BRIGHTNESS=50%

VIDEO VERTICAL BLANKING PULSE AND BRIGHTNESS WAVEFORM





SPARE PARTS LIST

1. COMPONENTS MARKED WITH "@ " ARE SAFETY RELATED PARTS. PLEASE READ PRODUCT SAFETY NOTICE BEFORE SERVICING.

2. SYMBOLS OF THE PARTS:

R: RESISTOR	F: FUSE	CX: X CAPACITOR OF POWER LINE	
C: CAPACITOR	FL: FILTER	CY: Y CAPACITOR OF POWER LINE	
Q: TRANSISTOR	FB: FERRITE BEAD	SCR: SILICON CONTROLLED RECTIFIER	
L: INDUCTOR	D(CR): DIODE	VR: VARIABLE RESISTOR	
T: TRANSFORMER	ZD: ZENER	IC: INTEGRATED CIRCUIT	
Z: VARISTOR	PTC: POSITIVE TEMPERATURE COEFFICIENT THERMISTORS		
	NTC: NEGATIVE TEMPERATURE COEFFICIENT THERMISTORS		

TOLERANCE: F=± 1% G=± 2% J=± 5% K=± 10% M=± 20% T=± 30%

DES.	DELTA P/N:	REFERENCE	DESCRIPTION
CR101	2000141612	KBJ406G	DIO BRD 600V 4A
D102	2010271201	UF4003	DIO FRD 1A.200V D41
D103	2010271201	UF4003	DIO FRD 1A 200V D41
D201	2010271607	UF4005	DIO FRD 1A 600V D204
D203	2010351207	EGP20D	DIO FRD 2A 200V D15
D204	2010271201	UF4003	DIO FRD 1A 200V D41
D205	2010271201	UF4003	DIO FRD 1A 200V D41
D207	2050010501	1N4001	DIO SI 1A 50V D41
D412	2010101601	RGP10J	DIO FRD 1A 600V D41
D413	2010101601	RGP10J	DIO FRD 1A 600V D41
D422	2040010001	1N4148	DIO SW 0.5A 100V
D423	2020280201	1N5817	DIO SBD 1A 20V D41
D424	2020280201	1N5817	DIO SBD 1A 20V D41
D501	2050011001	1N4002	DIO SI 1A 100V D41
F101	0804140601	5STP3.15	FUSE S/S 3.15A 250V SEM PIG
IC101	2510004001	UC3842N	IC PWM 8PIN
IC201	2500007001	MC7812CT	IC REGU 12V 1.5A T220 3PIN
IC202	2500005236	5002LH	IC REGU 0.2A 5V T92 3PIN
IC301	2510101044	80C51	IC 8BIT MP 40PIN
IC303	2610100058	ST93C56	IC CMOS 2KBIT EEPROM 8PIN
IC304	2540086007	LM62359	IC 8CH D TO A 8BIT 18PIN
IC305	2600019000	74LS86	IC XOR GATE 30mW 14PIN
IC401	2530021004	TDA9103	IC DEFLECTION PROCESSOR 42P
IC501	2530010006	TDA8172	IC IC TV VERT DEFLECTION 7PIN
IC601	2530019004	LM1207	IC 85MHZ VIDEO AMP 28PIN
Q102	2100020007	MPSA43	TR 200V 0.5A T92
Q402	2100044010	2SC3332S	TR 180V 0.7A T92 140-280
Q403	2100026001	2SC458C	TR 30V 0.1A T92 160-320
Q413	2100026001	2SC458C	TR 30V 0.1A T92 160-320
Q415	2430005003	2SK1377	FET 400V 5.5A T220
Q417	2100005001	2SA673C	TR 35V 0.5A T92 100-200
Q604	2100026001	2SC458C	TR 30V 0.1A T92 160-320
Q605	2100026001	2SC458C	TR 30V 0.1A T92 160-320
Q610	2100056006	2SC2705	TR 150V 50mA T92
Q611	2100055009	2SC4308	TR 20V 0.3A T92

SPARE PARTS LIST

ITEM	DESCRIPTION	P / N	QUANTITY	REMARK
1.	FRONT BEZEL	3360128000	1	
2.	SWITCH BUTTON	3000065516	1	
3.	COMPRESSION SPRING	3421102400	1	
4.	RUBBER PAD	3240032100	4	
5.	FUNCTION KNOB	3360062400	1	
6.	LED LENS	3360052500	1	
7.	PCB ASS'Y	5600020700	1	
8.	SCREW TAPPING M3*0.5*10mm	3100301000	2	
9.	SPACE SUPPORT	3421047901	2	
10.	METAL BRACKET	3421212600	1	
11.	CRT	0740740004	1	
12.	CRT GROUNDING WIRE ASS'Y	3640010704	1	
13.	DEGAUSSING COIL	2840000401	1	
14.	SCREW TAPPING 5*16*27	3109030201	4	
15.	VIDEO BOARD ASS'Y	5600020800	1	
16.	SHIELD CAN	3421114300	1	
17.	WARNING LABEL	3200120300	1	
18.	SPONGE	3240493100	1	
19.	REAR COVER	3360153000	1	
20.	ID LABEL	3200123901	1	
21.	SCREW TAPPING 4*18*16	3109020201	4	
22.	WIRE WITH TERMINAL	3640051600	1	
23.	SCREW TAPPING M3*0.5*8mm	3109010100	1	
24.	SCREW TAPPING M3*0.5*6mm	3109010600	2	
25.	SIGNAL CABLE ASS'Y	3072020501	1	

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Appendix A Spare Parts List A-1

Chapter 1

OSD (ON SCREEN DISPLAY) USER CONTROLS

1. OSD (ON SCREEN DISPLAY) USER CONTROLS 1-1
1.1 User Controls 1-2
1.1.1 Control Names 1-2
- Power Switch
- Power-On Indicator
- Function Select Buttons
- Adjustment Control Buttons

1.1 User Controls

See Figure 5 for the location of the following user controls and indicators. Each control is identified by number and is described individually.

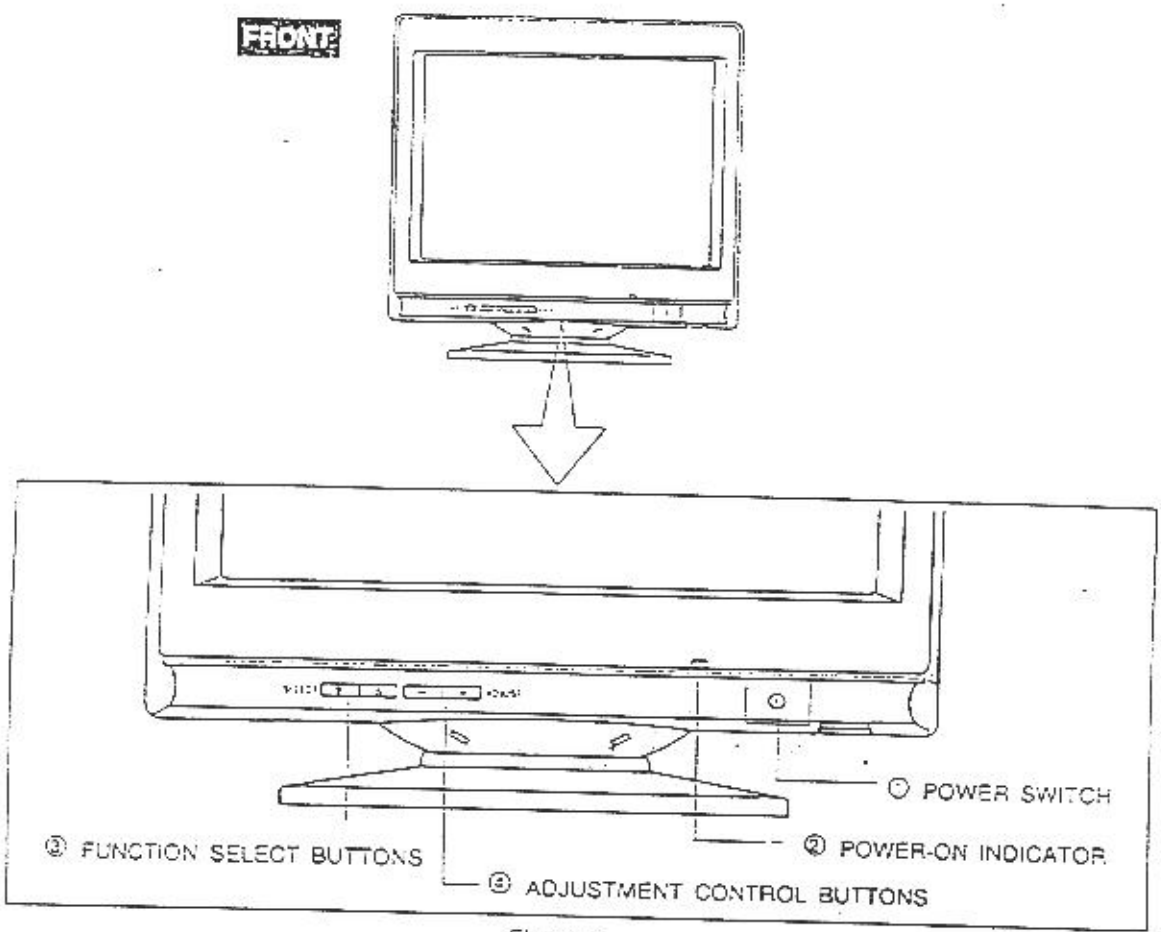


Figure 5

1.1.1 Control Names

① POWER SWITCH: A push-on / push-off switch for AC power.

② POWER-ON INDICATOR: This indicator illuminates when AC power is on.

③ FUNCTION SELECT BUTTONS: Push the up ( ) or down ( ) buttons and select the adjustment item for the desired adjustment.

④ ADJUSTMENT CONTROL BUTTONS: Push the increase ( ) or decrease ( ) buttons for the desired adjustment. All adjustments are memorized automatically when OSD menu is off.

Chapter 2

OSD (ON SCREEN DISPLAY) FUNCTION CONTROLS

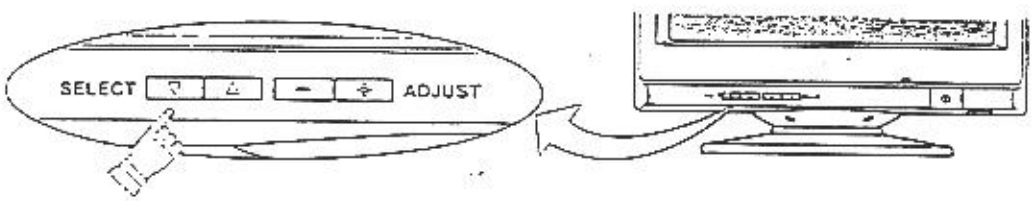
2. OSD (ON SCREEN DISPLAY) FUNCTION CONTROLS 2-1
2.1 Function Controls 2-2
- Select Button
- Contrast Control
- Brightness Control
- H. Size Control
- H. Center Control
- V. Size Control
- V. Center Control
- Pincushion control
- Trapezoid Control
- Color Temp Select
- Reset Control
- OSD Off Control

2.1 Function Controls

Refer to Figure 5 for the location of monitor function controls and see the indicators superimposed on display screen.

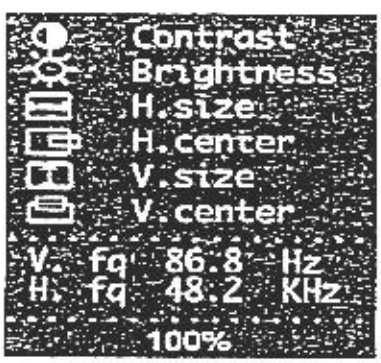
Press the select buttons (and) to choose one of the following controls.

When the indicator of a function symbol comes on the screen, that control is active and can be adjusted.



Press the select buttons (and), the cursor moves to the first character of function, you can then select the menu you want to adjust.

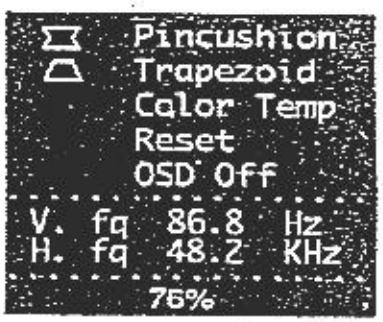
<1st screen>



select button ( )

select button ( )

<2nd screen>



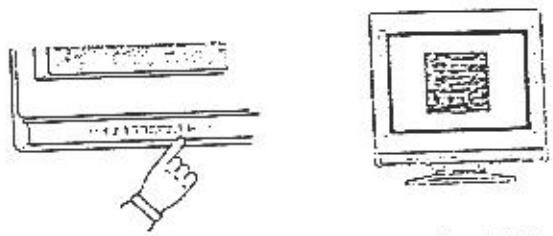
NOTE:
1. When the V.center is selected, press the button the screen changes to Pincushion of 2nd screen.
2. When the Pincushion is selected, press the button the screen changes to V.center of 1st screen.

Contrast control

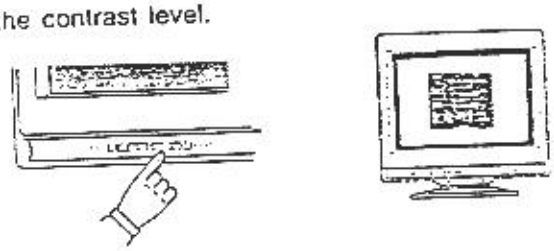
This controls the contrast level. (image brightness level)

Adjustment level is indicated 0%~100%.

Press the plus ( ) button to increase the contrast level.

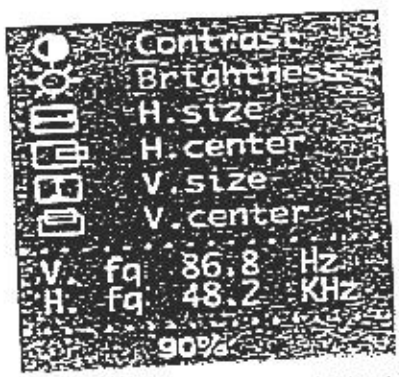


Press the minus ( ) button to decrease the contrast level.



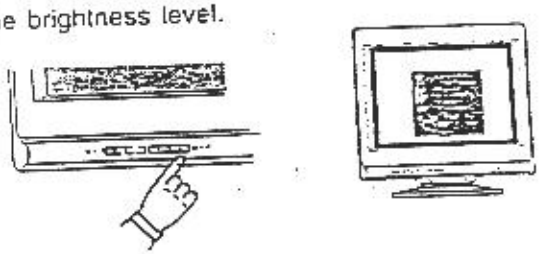
Brightness control

This controls the black level of the screen.

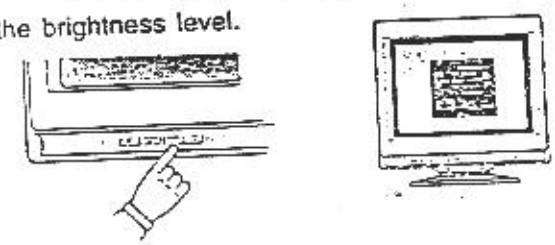


Adjustment level is indicated 0%~100%.

Press the plus ( ) button to increase the brightness level.



Press the minus ( ) button to decrease the brightness level.



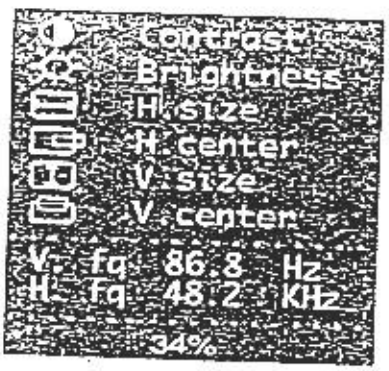
Brightness Control Adjustment Procedure:

1. Adjust the contrast control to mid-range.
2. From the maximum brightness setting, slowly reduce the level until the black border of the background matches the black level in your image area.
3. Lastly adjust the contrast control for a comfortable brightness level.

Note: Do not set the contrast level upwards to the degree that small characters begin to "bloom" or "bleed".

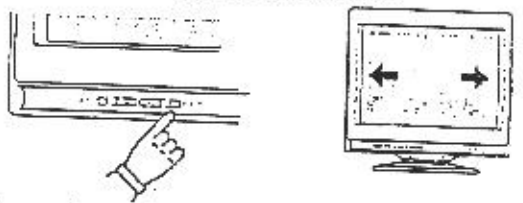
H. size control

This contro's the horizontal size of the image on the screen.

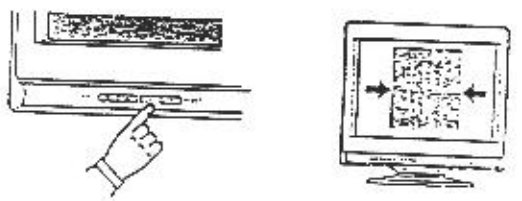


Adjustment level is indicated 0%~100%.

Press the plus ( ) button to expand the width of the image on the screen.

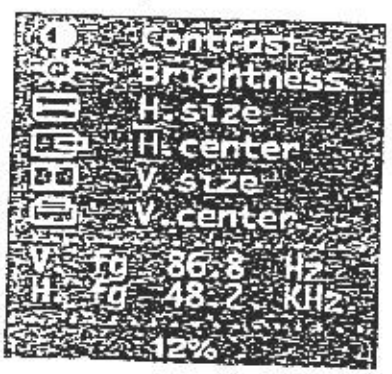


Press the minus ( ) button to narrow the width of the image on the screen.



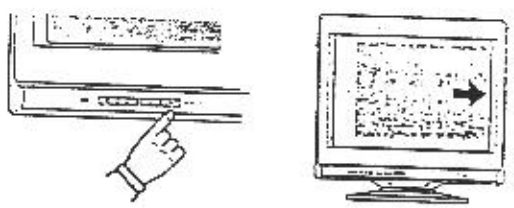
H. center control

This controls the horizontal position of the image on the screen

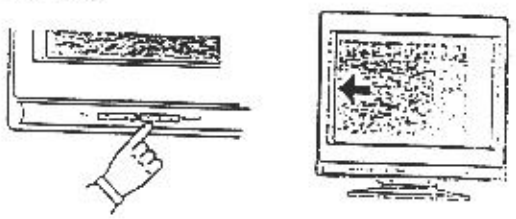


Adjustment level is indicated 0%~100%.

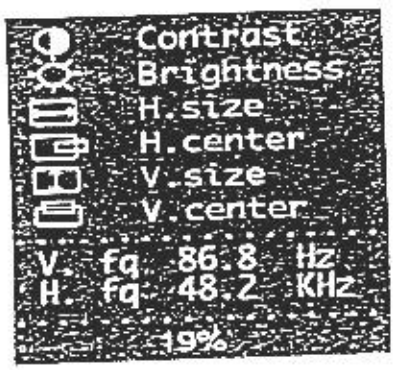
Press the plus ( ) button to move to the right.



Press the minus ( ) button to move to the left.

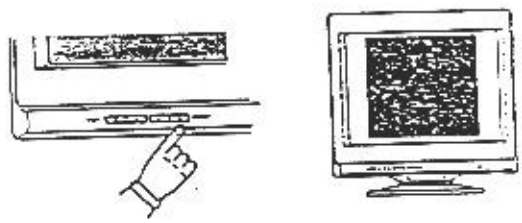


V. size control
This controls the vertical size of the image on the screen.

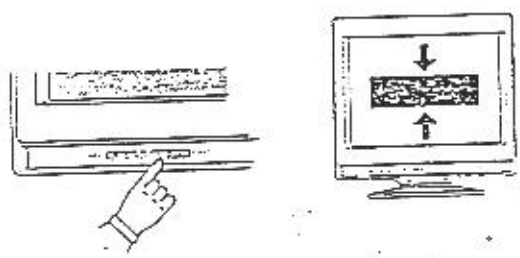


Adjustment level is indicated 0%~100%.

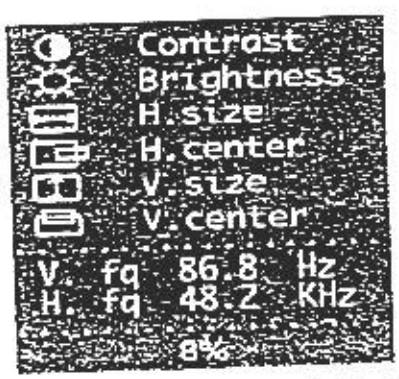
Press the plus (⊟) button to expand the height of the image on the screen.



Press the minus (⊟) button to decrease the height of the image on the screen.

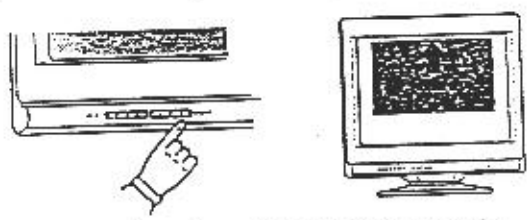


V. center control
This controls the vertical position of the image on the screen.

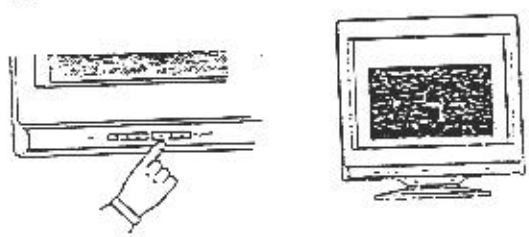


Adjustment level is indicated 0%~100%.

Press the plus (⊟) button to move the image up.

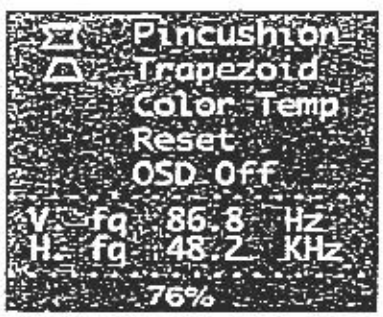


Press the minus (⊟) button to move the image down.



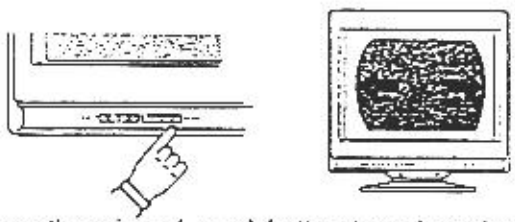
Pincushion control

Pincushion control allows you to clear up "Pincushion" distortion, in which the image bows inward or outward.

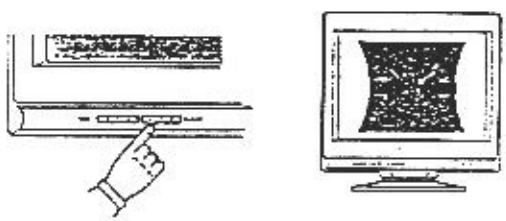


Adjustment level is indicated 0%~100%.

Press the plus (⊟) button to expand the center of the image.

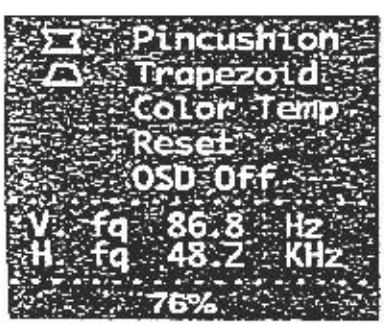


Press the minus (⊟) button to reduce the center of the image.



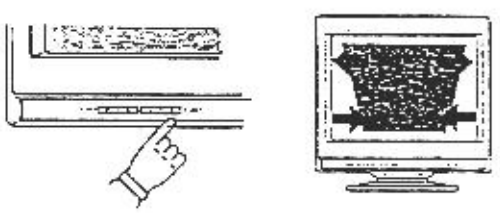
Trapezoid control

Trapezoid control allows you to clear up "Trapezoid" distortion.

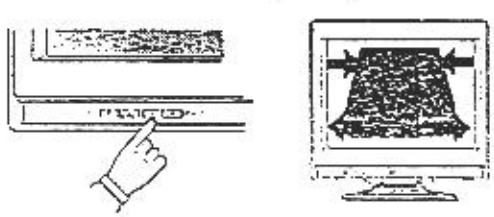


Adjustment level is indicated 0%~100%.

Press the plus (⊟) button to increase the width at the top of the screen image and to decrease the width at the bottom.



Press the minus (⊟) button to decrease the width at the top of the screen image and to increase the width at the bottom.



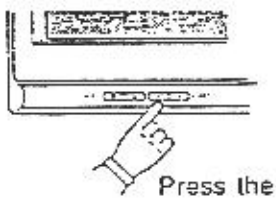
Color Temp Select

Color Temp select provides the user with the following two color balances for display.

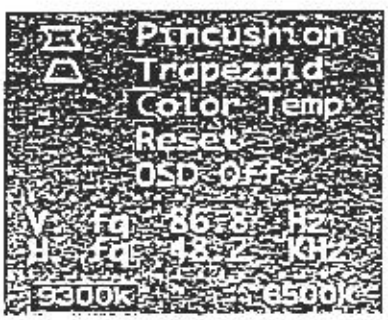
Press the plus (⊡) or minus (⊟) buttons to select the desired color mode for your application.

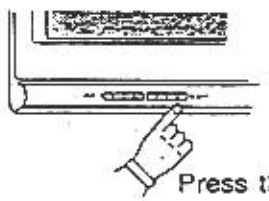
Press the plus (⊡) button and select 6500K to increase red color level.

Press the minus (⊟) button and select 9300K to increase blue color level.

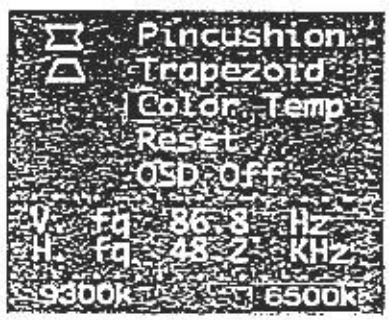


Press the minus button.



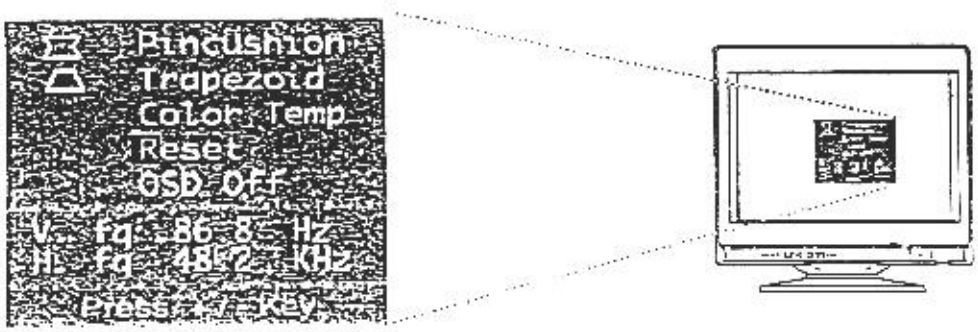


Press the plus button.



Reset control

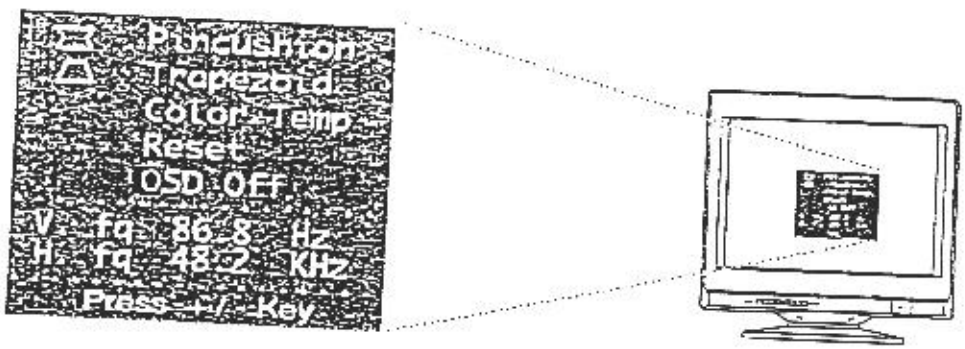
Press the plus (⊡) or minus (⊟) button when reset function is selected, the picture's geometry will be restored to factory adjustment condition.



OSD Off control

Press the plus (⊡) or minus (⊡) button to quit the OSD function and memorize all the adjustment datas.

In spite of turning off the monitor, the screen will appear as you adjusted, when turn on again.



NOTE: Quick OSD Off, with memorizing adjustment data.

Press both select buttons (⊡ ⊡) at once, or press both adjust buttons (⊡ ⊡) at once.

Chapter 3

CIRCUIT DESCRIPTION

3.1 Function Controls

3.1 Power Supply (Switching Mode Power Supply) 3-3
3.2 Power Saving 3-4
3.3 Micro-Controller Unit 3-5
3.4 Sync. Processor 3-5
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3.5.2 Horizontal Synchronization Processing 3-7
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3.5.5 Boost Converter 3-10
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3.6.6 Contrast, Gain and Bias Control 3-14
3.6.7 DDC 1/2B 3-14

3. CIRCUIT DESCRIPTION

3.1 POWER SUPPLY(switching mode power supply fly-back type)(IC101)

The raw DC B+ voltage is got from AC input voltage after EMI filter and rectifier. It supplies lower voltage Vcc to PWM controller, IC101 UC3842), through start-up circuit (R122, R129, R124 R127, R125, Q102, ZD102). R113 & C109 generate triangle wave-form to decide switching frequency. In order to power supply synchronism that must feedback Horizontal-Synch to "FB+" from FBT(T401) and forced power supply synchronization with Horizontal deflection circuit. The pin6 is output of IC101 to drives power MOSFET Q101. A High-frequency & High-Voltage square wave-form is across the primary winding and transfers energy to the secondary. The output DC voltage gets after rectifying and filtering.

In order to have a stable and regulated output voltage while AC input voltage and output load change. D103 "+" voltage is feedback to IC101 pin2 from R115 and PWM controller circuit will adjust duty cycle and maintain stable voltage.

The PWM controller IC101 is started up from the raw B+ . The lower voltage, Vcc. is provided by T101's AUX-Winding(pin8) through D103 D102, C106,C107. TP201=88.5V is adjusted by VR101.

3.2 POWER SAVING

According to TCO agreement with monitor manufacturer is as the following table:

SYNC. INPUT	H. & V. PRESENTED	NO H. OR V.	NO H. AND V.
MODE	NORMAL ON	SUSPEND	POWER OFF
TTL SIGNAL			
SW1	Hi	Lo	Lo
SW2	Hi	Hi	Lo
LED	Green	Amber	Amber
Power (Watt)	60-90	<15	<8

SW1 : IC301 pin27, suspend (SUS)
SW2 : IC301 pin28, power down (PD)

- SW1 and SW2 are Hi level at normal-on mode.

- The suspend mode occurs when sw1 is at low level. (by IC301 pin27) The B+ (16V) are switch off via Q201, Q207.

- The power-off mode occurs when sw1 and sw2 are at low level. Both B+ (16V) and 6.3V are switch off via Q201, Q207, Q202, Q203 respectively.

The micro-processor IC301 are drived to over-ride mode for self test, which means monitor is without power saving function when signal cable is not connected to PC.

3.3 MICRO-CONTROLLER UNIT (MCU)(IC301)

IC301 is a 8-bit micro-controller (8051) with 4K byte ROM memory, which play a main role of the digital control monitor. It performs as mode timing detector, key control scanner and controller, DPMS power saving handling. on screen display programmer and auto-alignment I/O communication. Pin36, 37, 38, 39 are for key control. Pin21, 22, 23, 24 are for s-correction switch control, pin12,13 are for Horizontal and Vertical sync. input respectively, pin14 is for Horizontal sync polarity detection. Pin1(DI) and pin2 (CLK) are as series data and clock (CLK) input for IC303(EEPROM), IC604(DAC), IC304(DAC). Pin3 is chip selection to IC303, pin4 is as an data input from output of IC303, Pin5/6(LD, LD2) are also chip load selection for IC304 and IC604 respectively. Pin32 is chip selection to IC603 .Pin8/7 are serial clock and serial data²(SCL, SDA) bus by software simulation to program OSD IC603(SDA, SCL). Pin10(RXD)/11(TXD) are as a port to communicate with alignment fixture or computer by RS232.

CS CONTROL FUNCTION

	VGA 640X400	VGA 640X480	8514/A	VESA640 X480/75	VESA640 X480/85	VESA800 X500/75	VESA800 X600/72	VESA800 X600/85	VESA1024 768/75	VESA1280 1024/60
CS2 (PIN23)	LO	LO	LO	HI	LO	LO	LO	HI	HI	HI
CS3 (PIN22)	LO	LO	LO	LO	HI	HI	HI	HI	HI	HI

NOTE:CS1 CS4 NO USED.

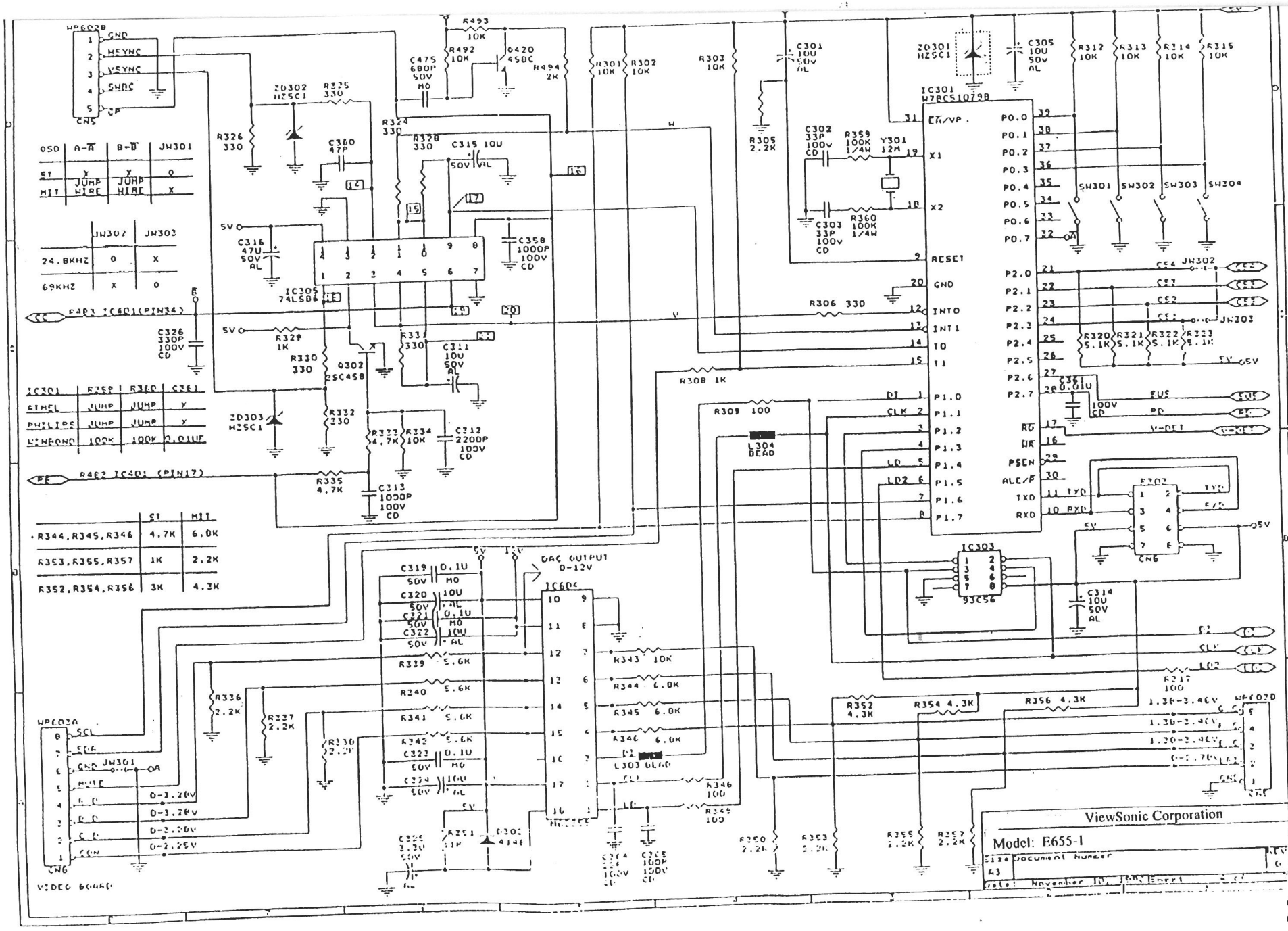
3.4 SYNC. PROCESSOR(IC305)

IC305 (74LS86) is a guard exclusive OR gate TTL device which is mainly to proceed both Horizontal and vertical sync. signal in a proper polarity and timing.

The horizontal sync. output at pin 8 in a positive polarity, the signal not only are as a input of horizontal AFC LOOP(to IC401, pin17), also as a clamping signal for video preamplifier.

Q420, C475, R492, R493 compose a one-shot multivibrator to enlarge the horizontal sync. width for MCU requirement.

Vertical sync. output comes out at pin 6, and feed to IC401 pin34. Q302, R335, C313, R333, C312 compose a integrator to separate the vertical sync from composite sync.


ViewSonic Corporation
Model: E655-1
VIDEO BOARD
DAC OUTPUT 0-12V
1.36-3.46V
0-3.70V
0-3.28V
0-2.28V
November 10, 1997

3.5 DEFLECTION CIRCUIT

3.5.1 Horizontal Phase Shifter:

This function is operated by a part of circuit inside IC401 (TDA 9103). The picture phase adjustment is control by a DC voltage at pin 15. The voltage of this point change from pin 4 of IC 304 (DAC).

3.5.2 Horizontal Synchronization Processing

The horizontal synchronization processor is integrated inside the chip of TDA9103(IC401). It uses a dual phase-lock-loop (PLL1/PLL2) design.

The processor can synchronize with the input sync. up to triple of free-run frequency which is determined by R456 and C439.

The PLL1 circuit is used to control the oscillator frequency and maintains it in proper frequency and phase with the incoming sync signal. One input is coupled from output of VCO which is built inside the IC.

A loop filter with a properly selected time constant (C441, C440, R457) is connected at pin12. D423, D424, C478 compose a network of smoothing loop filter response during input frequency change from high to low. This is to avoid horizontal output device damage by this manner.

The PLL2 circuit is used to maintain proper relationship between incoming sync. and yoke current. One input is from the output of VCO (which is inside the IC) and a second input (pin3 of IC 401) is coupled from pin2 of T402 (FBT) via R451.

The control voltage formed through loop filter is to control horizontal output pulse output at proper duty cycle and maintain the phase between raster and picture.

The horizontal drive pulses are sent from pin21 of IC401 and duty cycle is determined by R449 and R450.

EXPLANATION OF TERMINALS

Pin No.	Symbol	Function
③	DI	Serial data input terminal
⑮	Do	Serial data output terminal
②	CLK	Serial clock input terminal
①	LD	LD terminal input high level then latch circuit data load *1
⑰	V_{DD}	Digital power supply terminal
⑪	Vcc	Analog power supply terminal
⑧	GND	Digital and analog common GND
⑩	V_{refU}	D-A converter high level reference voltage input terminal
⑨	V_{refL}	D-A converter low level reference voltage input terminal
⑯	$\overline{R}$	Reset terminal
⑫	A_{O1}	8-bit D-A converter output terminal
⑬	A_{O2}	
⑭	A_{O3}	
⑮	A_{O4}	
④	A_{O5}	
⑤	A_{O6}	
⑥	A_{O7}	
⑦	A_{O8}	

*1 When the LD terminal is "H" input data has load.

ABSOLUTE MAXIMUM RATINGS (Ta=25°C, unless otherwise noted)

Symbol	Parameter	Conditions	Ratings	Unit
Vcc	Supply voltage		−0.3~13.5	V
V_{DD}	Supply voltage		−0.3~7	V
V_{refU}	D-A converter high level reference voltage		V_{DD}	V
V_{IN}	Input voltage		−0.3~V_{DD}+0.3	V
I_{OO}	Output current		−5~+5	mA
I_{AO}	Buffer amplifier output current range		−5~+5	mA
T_{OPR}	Operating temperature		−20~+85	°C
T_{STG}	Storage temperature		−40~+125	°C

RECOMMENDED OPERATING CONDITIONS

- Digital supply voltage V_{DD} 5V±10%
- Analog supply voltage Vcc V_{DD}−13V

ELECTRICAL CHARACTERISTICS

Digital part (Vcc=13V, V_{DD}=V_{refU}=5V, Ta=−20−+85°C, unless otherwise noted)

Symbol	Parameter	Test conditions	Limits			Unit
			Min	Typ	Max	
V_{DD}	Supply voltage		4.5		5.5	V
I_{DD}	Circuit current	CLK=1MHz in action			1	mA
V_{IL}	Input low voltage				0.2V_{DD}	V
V_{IH}	Input high voltage		0.8V_{DD}			V
V_{OL}	Output low voltage	I_{OL}=1.0mA			0.4	V
V_{OH}	Output high voltage	I_{OH}=−400μA	V_{DD}−0.4			V

3.5.3 Horizontal Driver Stage

The horizontal drive pulse is applied to the base of driver transistor Q402. B+ is provided by the regulated 88.5V voltage source via R403, R404, R405 and C406. The output of driver transformer T402 is coupled to the base of Horizontal output Transistor Q401. C404, C405 and R402 compose of damping network which is to eliminate the leakage flux of T402 during Q402 turns off.

3.5.4 Horizontal Scanning And High Voltage Power Supply Circuit

The horizontal scanning is accomplished in a diode modulator method. Except the basic horizontal scan output, the diode modulator add one second resonant circuit during retrace time, which also performs the parabola modulation in yoke current to compensate the pincushion effect.Linearity coil L404/L403 corrects the asymmetrical distortion. C415/C418/C419/C423/ C420 are S-Correction capacitors,C415/C418/ C423 are switched on/off according to different H-frequency.

The conducting period of horizontal output transistor Q401 and D402 completes the second half of scan. The conducting period of damper diode D401 completes the first half part of horizontal scan.

The retrace capacitor is C401, the charge and discharge actions of retrace capacitor via yoke after Q401 turned off, which is designed for the same resonant frequency with the main scan circuit.

In the high voltage drive circuit, the output of Q401 is applied to the primary winding of flyback transformer (FBT) T401 and drives the flyback transformer to supply CRT anode voltage of about 24KV by stepping up FBT during retrace period.

Several drived power sources are developed in the FBT secondary, including 110Vp-p source (pin1) for boost converter feedback reference, Horizontal blanking pulse (HBL) and OSD horizontal synch(OHS), AFC pulse (pin2), XRP pulse (pin2).

3.5.5 Boost Converter

In order to maintain same scan width and anode voltage within 30K-65KHz, the scan supply B+ tracked with continuos H-frequency is necessary, and the design is implemented by a convention method-of boost converter.

The boost converter mainly composes of a n-channel MOSFET (Q416), choke L406, capacitor C449 and rectifier diode (D418).

The PWM control circuit is integrated in IC401, pin40 is inverting, pin41 is output of error amplifier, both for frequency compensation and gain setting and pin39 is DC controlled of B+ adjustment. PWM pulse width output at pin22 is modulated according to internal error amplifier output and pin42 current sense.

3.5.6 The E-W Pincushion Correction And Width Control Circuit

The voltage across C414 can be varied in accordance with a vertical parabolic wave-form which is generated by two stage drive Q407, Q408, Q409. The peak yoke current is decreased in proportion to the voltage across C419, as the voltage across C414 is increased for compensating the pincushion effect. The parabolic wave-form is generated from IC401 pin36.

The DC voltage across C414 also can be varied to control the picture width, which can be done through IC304(DAC) controlled pin5.

3.5.7 TRAPEZOID CONTROL

Trapezoid is controlled by pin38 of ic401 that DC control from pin12 of IC304 (DAC).

3.5.8 X-RAY-RADIATION PROTECTION

circuit. Therefore, should a fault occur which would activate the X-ray protect circuit, Should a fault occur which would cause the high voltage to increase above a predetermined level, the positive pulse at pin2 of the FBT (T402) would go more positive. This action in turn would increase the voltage applied to Zener diode (ZD402) to exceed its breakdown voltage. This in turn would apply more voltage to the pin16 of the IC401. Shutting down the horizontal oscillation and drive pulse.

NOTE: The X-RAY-Radiation protection circuit used in this monitor is a latching type the monitor will shutdown and continue until turn-off the monitor with power switch.

3.5.9 Vertical Deflection(IC501)

Vertical deflection function is operated in the chip IC401 (TDA9103), IC304 (M62359), IC501(TDA8172) which mainly contains the oscillator, ramp generator, power output amplifier and flyback generator. Vertical oscillator is obtained amplifier by means of an integrator driven by oscillation circuit that is determined by C518. The vertical sync signal is applied to the pin34 of IC401 through R483. Once the sync signal synchronized a clock pulse is generated inside this chip. The clock pulse is just as a sync input of ramp generator. A liner voltage ramp is produced at pin30 of IC401, and is couple to IC501 pin1 for vertical output amplitude Vertical output amplitude is controlled by pin31 of IC401.

Power amplifier is a voltage-to-current power converter, which is supplied by the main supply at pin6 during the retrace time. Pin7 is internally coupled to the inverting input of the power amplifier. An external feedback network R511 defines the DC level across so allowing a correct centering of the output voltage. A small part of the parabola, and AC feedback is taken from the voltage across R515.

Pin5 is the output of the power amplifier and it drives the yoke by a negative slope current ramp, R508 and the series network R509 C507 (damping function) are used to stabilize the power amplifier. Pin3 is the output of the flyback generator which is driven during flyback time. When driving voltage jumps from low to high condition. An external capacitor C502 coupling pin3 wave-form to pin6, voltage of which is boosted up two times of the main supply to perform the retrace action of scanning.

Vertical centering is controlled by changing the DC voltage at vertical output IC pin7 that is caused from the DC shift of IC401 pin32, and that can be adjusted by DC control (pin33 of IC401).

3.6 VIDEO

3.6.1 VIDEO AMPLIFIER(IC601)

The video amplifier module is composed of three amplifiers for red, green, blue channel.

The video input signal is fed to the video preamplifier IC601(LM1207) (pin4 blue, pin6 red, pin9 green) through AC coupling capacitor. C604,C606,C608.

The clamping pulse comes from Q604 collector.

(Q606, Q608) (Q611, Q613) & (Q616, Q618) are cascade amplifier for B.R.G. channel respectively.

3.6.2 On Screen Display (OSD)(IC603)

IC603 (M35043) is a on screen display generator, pin18 for H-sync input, pin19 for V-sync input. The IC603 is controlled by IC301 (80C51) via CS, SCL, SDA bus IC603 (pin4, pin5, pin6).

The on screen display signal is output from pin15(G), pin17(B) and connected to video output stage by mixer circuit Q607, Q617.

3.6.3 Auto Beam Limit CKT (A. B. L. CKT)

When beam current pass through R430,VR403 over 300uA, the voltage build at base of Q601 will be low enough to turn on Q601, then the voltage of pin 12 of IC601 will be pulled down accordingly to reduce the video preamplifier gain output.

3.6.4 Brightness Control

Brightness is controlled by varying the DC voltage of Q624 with the IC604 (M62359) pin7.

3.6.5 Blanking CKT

IC501 (TDA8172) pin5 vertical blanking pulse are fed to the base of Q626 (2SC1213). The blanking pulse O/P is coupled to G1 by C661 Horizontal blanking pulse are fed to Q602 base and let video O/P Amp cut off during the period of horizontal retrace. While mode change. IC301 pin15 will pull high to turn on Q605 (mute function) and the pin 13 of IC601 is pulled low to cut off video output.

3.6.6 CONTRAST, GAIN & BIAS CONTROL

The IC601 (LM1207) contains three gated single ended input black level clamp comparators for brightness control, three matched DC controlled attenuators for contrast control, and three DC controlled sub-contrast attenuators providing gain trim capability for white balance.

All the DC control voltage are comes from IC604(M62359 Digital to Analog Converter), the IC604(LD, CLK, DI, pin1, pin2, pin3) is controlled by IC301(80C51) Micro controller via a serial bus.(IC301 pin1, pin2, pin5).
IC301 control item include: IC604 pin7=Brightness, pin4=G-Bias, pin5=R-Bias, pin6=B-Bias, pin12=R-gain, pin13=B-gian, pin14=G-gain, pin15=contrast AND IC304, pin15: sub-contrast.

3.6.7 DDC1/2B(IC51)

IC51(24LC21) can transmit continuously it's extended identification, "EDID" using DDC1 communication channel. In addition, the monitor can respond to a regrets for EDID, or complete VDIF, to be transmitted using DDC2, level B commands. Pin6 SCL is clock input for DDC 2B, pin5 SDA for data input. Pin7 Vsync is clock input for DDC1 through V-sync.

Chapter 4

ADJUSTMENT PROCEDURE

4. ADJUSTMENT PROCEDURE

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4.1 General

1. ALL SPECIFICATION MUST BE MET OVER LINE VOLTAGE RANGE OF 90 VAC TO 264 VAC 50HZ/60HZ . UNLESS OTHERWISE SPECIFIED .
2. OPERATING TEMPERATURE RANGE IS 0 DEG. C TO 40 DEG. C WITH A RELATIVE HUMIDITY OF 5% OR LESS TO 95% .
3. THE MONITOR MUST BE OPERATIONAL IN AN USABLE STATE WITHIN 30 SECONDS AFTER TURN-ON .
4. ALL SIGNAL LEVELS ARE MEASURED ASSUMING TERMINATION AT THE MONITOR'S INPUT JACKS OR IN ITS CHARACTERISTIC IMPEDANCE .
5. AN AMBIENT LIGHTING LEVEL OF 400 TO 600 LUX IS ASSUMED WHEN SETTING BRIGHTNESS FOR RASTER EXTINCTION THRESHOLD .
6. ALL PURITY RELATED SPECIFICATIONS MUST BE MET WITHOUT EXTERNAL DEGAUSSING .
7. ALL CONTROLS MUST HAVE EXCESS RANGE (NO CONTROL MAY BE LEFT AT AN END STOP WHEN PROPER ALIGNMENT IS COMPLETED) .
8. THE MONITOR IS NOT REQUIRED TO MEET SPECS DURING THE FOLLOWING BUT MUST TOLERATE , WITHOUT DAMAGE TO THE CRT OR CIRCUITS , ANY SEQUENCE OR COMBINATION OF POWER ON AND OFF , SIGNAL ON AND OFF , UNPLUGGING OF POWER OR SIGNAL , ERRATIC , WRONG FREQUENCY OR NOISY INPUTS WHILE AT ANY POSSIBLE SETTINGS OF USER ACCESSIBLE CONTROLS . LIKEWISE , THE MONITOR SHOULD SURVIVE EXTENDED PERIODS OF OPERATION WITH LINE VOLTAGE REDUCED BELOW THE SPECIFIED MINIMUM .
9. AN ISOLATION TRANSFORMER SHOULD BE USED WHEN PERFORMING ALIGNMENT AND TESTS . PORTIONS OF THE POWER SUPPLY BOARD ARE HOT GROUND . THE REMAINING BOARDS ARE COLD GROUND .
10. DISCHARGE OF CRT ANODE SHOULD BE DONE ONLY TO CRT GROUND STRAP .
11. GEOMETRIC MEASUREMENT ARE ASSUMED TO BE MADE ALONG A STRAIGHT SURFACE WITH A FLAT RULE OR TEMPLATE .

4.2 Alignment and Test Specification

4.2.1 Deflection Presets

- CONTROL POTS VR101,VR401,VR402,VR403 ARE SET AT MIDDLE POINT SCREEN
- VR SET TO MIN.

4.2.2 Power Supply Alignment

1 INPUT VGA(480) SIGNAL & CONTRAST SET AT MIN .

2 ADJUST VR101 UNTIL VOLTAGE TP201=88.5V±0.5 .

3 ADJ VR402 UNTIL VOLTAGE AT TP403 = 63V±0.5% .

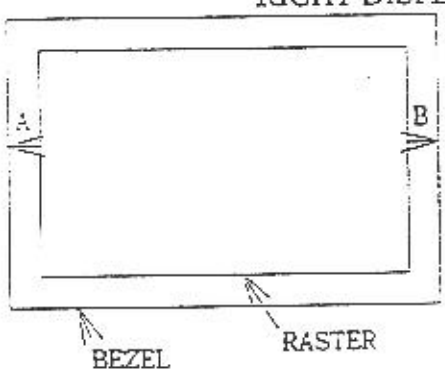
4.2.3 Horizontal Alignment

4.2.3.1 Raster Centering

1 INPUT TEST SIGNAL FLAT WHITE PATTERN AT VESA 800*600 75HZ MODE .

2 ADJUST CONTRAST TO 10FL , ADJUST SCREEN JUST RASTER VISIBLE .

3 ADJUST VR401 AT TWO DIFFERENT POSITIONS OF JW403 , JW402 TO CENTER RASTER ON SCREEN SUCH THAT THE HORIZONTAL DISTANCE FROM THE MIDPOINT OF THE LEFT DISPLAY EDGE TO THE LEFT BEZEL EDGE IS WITHIN 2mm OF THE DISTANCE FROM THE MIDPOINT OF THE RIGHT DISPLAY EDGE TO THE RIGHT BEZEL EDGE .

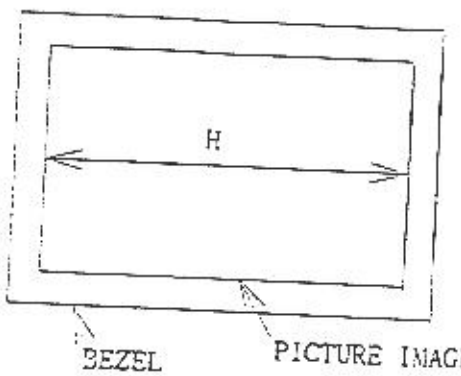


$|A-B| < 2mm$

NOTE : MAGNETIC FIELD (G) : V = 0.40 (N) , H = 0
V = -0.40 (S) , H = 0

4.2.3.2 Picture Width

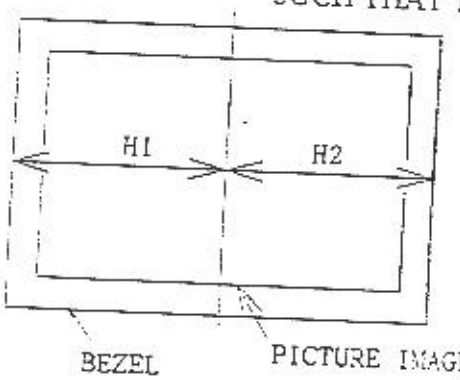
1 INPUT VESA 800*600 75HZ SIGNAL, ADJUST "WIDTH" TO ACHIEVE 260 ± 2mm .



H=260+-2mm

4.2.3.3 Picture Centering

1 INPUT CROSSHATCH AT VESA 800*600 75HZ MODE , ADJUST "PHASE" SUCH THAT THE PICTURE IS CENTERED WITH THE RASTER .

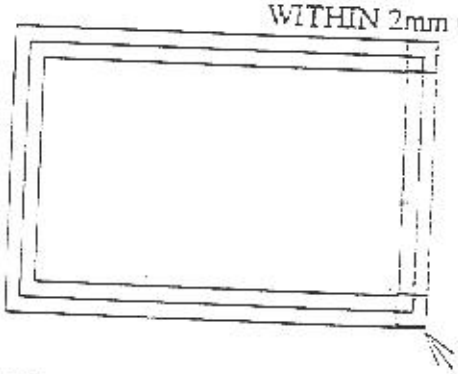


$|H1-H2| < 2mm$

4.2.3.4 E-W Side Pincushion

1 INPUT TEST SIGNAL D AT VESA 800*600 75HZ MODE .

2 ADJUST "E-W" SUCH THAT PINCUSHION / BARREL DISTORTION FALLS WITHIN 2mm OF THE NOMINAL RECTANGLE SPECIFIED BY FIG.A .



4.2.4 Focus Adjustment

1 APPLY SIGNAL E (ALL "ME" PATTERN) AT VESA 800*600 75HZ MODE .

2 SET BRIGHTNESS TO THRESHOLD OF RASTER EXTINCTION AND CONTRAST AT MAX BEAM CURRENT .

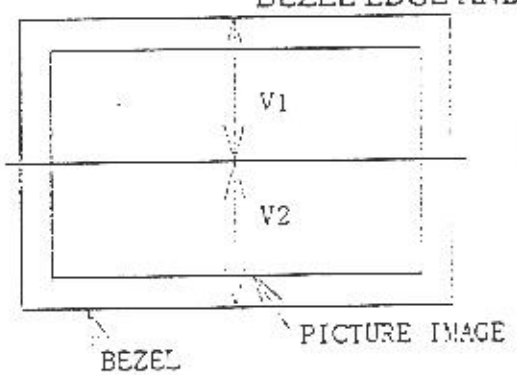
3 SET FOCUS CONTROL FOR BEST FOCUS AT MIDPOINT OF DIAGONAL LINE F 10 : 00 CORNER TO CENTER OF SCREEN . INDIVIDUAL PIXELS SHOULD BE DISTINGUISHABLE OVER ENTIRE DISPLAY AREA .

4.2.5 Vertical Section Adjustment

4.2.5.1 Center with Magnetic Field

1 APPLY CROSSHATCH : VESA 800*600 75HZ . PATTERN : CROSSHATC

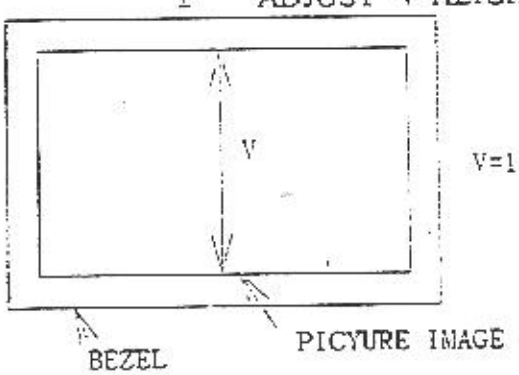
2 ADJUST "V-CENTER" TO THE VIDEO DISPLAY VERTICALLY SUCH T THE VERTICAL DISTANCE FROM THE CENTER OF PICTURE TO THE BEZEL EDGE AND THE BOTTOM BEZEL EDGE IS WITHIN 2mm .



4.2.5.2 Vertical Height

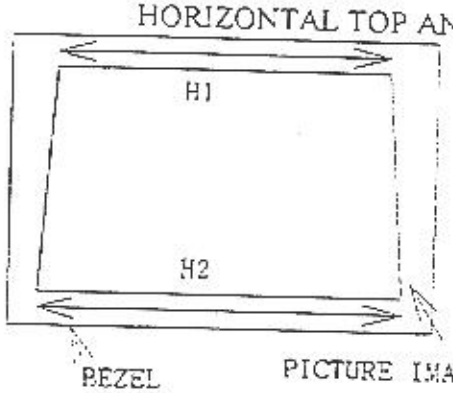
1 APPLY SIGNAL D MODE VESA 800*600 75HZ PATTERN : CROSSHATC

2 ADJUST "V-HEIGHT" SUCH THAT VERTICAL HEIGHT IS 195mm ± 2.0



4.2.5.3 Trapezoid Adjustment

ADJUST "TRAPIZUM" SUCH THAT THE DIFFERENCE OF WIDTH BETWEEN HORIZONTAL TOP AND BOTTOM OF PICTURE IS LESS THAN 2mm .



$|H1-H2| < 2mm$

4.2.5.4 Function "Save"

PUSH "SELECT" BUTTON TO "SAVE" FUNCTION AND PUSH "ADJUST" BUTTON . THE "OK" CHARACTER WILL BE DISPLAY ON SCREEN UNTILL ALL ADJUSTMENTS ARE SAVED .

4.2.5.5 Function "Reset"

PUSH "SELECT" BUTTON TO "RESET" FUNCTION , AND PUSH "ADJUST" + OR − BUTTON . THE PICTURE SHOULD RESTORE TO THAT OF FACTORY MODE .

4.2.6 Video Presets Condition

1 R.G.B BIAS TO MIN .

2 R.G.B DRIVER TO MAX .

3 BRIGHTNESS TO MAX. CONTRAST TO MAX .

4.2.7 Video Alignment

1 APPLY VESA 800*600 75HZ FULL BLACK PATTERN .

2 TURN THE G2 KNOB TO OBTAIN RASTER LIGHT O/P ABOUT 0.4 FLS .

3 ADJUST R.G.B BIAS CONTROL TO MEET FOLLOWING CHROMATICITY SPEC .

9300°K → x = 0.281 ± 0.003 , y = 0.311 ± 0.003 , Y = 0.7 ± 0.3 FLS
(6550°K → x = 0.313 ± 0.003 , y = 0.329 ± 0.003)

4 RECALL BRIGHTNESS 50% CONTRAST 100% . (OSD)

5 APPLY 50mm*50mm WINDOW PATTERN .

6 ADJUST R.G.B DRIVER AND SUB-CONTRAST CONTROL TO MEET FOLLOWING CHROMATICITY SPEC .

9300°K → x = 0.281 ± 0.003 , y = 0.311 ± 0.003 , Y = 46 ± 3 FLS
(6550°K → x = 0.313 ± 0.003 , y = 0.329 ± 0.003)

7 SAVE SUB-CONTRAST

SAVE 9300 (SAVE 6550)
RECALL 9300(SAVE 6550)

REPEAT ITEM 7.3 TO ITEM 7.7 ADJUSTION ACTION,ADJUST 6550.

8 RECALL BRIGHTNESS 50% CONTRAST 100% . (OSD)

9 ADJUST BRIGHTNESS TO 50% .

10 APPLY FULL WHITE PATTERN .

11 ADJUST VR403 TO OBTAIN LIGHT O/P = 30 FLS .

12 RECALL BRIGHTNESS 50% CONTRAST 100% .

13 ADJUST CONTRAST FROM MAX TO 10 FLS AND CHECK THE CHROMATICITY MEET FOLLOWING SPEC (COLOR TRACKING) .

9300°K ONLY FOR VESA 800*600 75HZ | x (MAX) - x (10FLS) | ≤ 0.015
| y (MAX) - y (10FLS) | ≤ 0.015
THE OTHERS MODE | x (MAX) - x (10FLS) | ≤ 0.02
| y (MAX) - y (10FLS) | ≤ 0.02

4.2.8 Video Test

4.2.8.1 White Balance Chromaticity, Color Tracking, Average Light O/P

1 APPLY SIGNALL ALL MODES , PATTERN : FLAT WHITE FIELD .

2 ADJUST BRIGHTNESS TO 50% . AND LET LIGHT OUTPUT = 25FLS .

3 COLOR TEMPERATURE CORDINATES MUST BE VESA 800*600 75HZ

A. 9300°K → X = 0.281 ± 0.015 ; Y = 0.311 ± 0.015
6550°K → X = 0.313 ± 0.03 ; Y = 0.329 ± 0.03

B. OTHER MODES
9300°K → X = 0.281 ± 0.02 ; Y = 0.311 ± 0.02
6550°K → X = 0.313 ± 0.03 ; Y = 0.329 ± 0.03

4 COLOR TRACKING ERROR (ONLY FOR 9300°K)

WHEN THE FLAT WHITE FIELD IS DISPLAYED AT PRESET CONDITION . THE DIFFERENCE OF WHITE BALANCE CONTRAST MAX. AND LOW CONTRAST (10FL) MUST BE LESS THAN FOLLOWING VALVE .

| X (AT 30FLS) - X (AT 10FL) | ≤ ΔX VESA800*600 75HZ ΔX,ΔY = 0.015

| Y (AT 30FLS) - X (AT 10FL) | ≤ ΔY OTHER MODES ΔX,ΔY = 0.02

5 AVERAGE (CONTRAST = MAX , BRIGHT = 50%) LIGHT OUTPUT MUST BE BETWEEN 28FL AND 33FL .

4.2.8.2 Contrast Range

1 APPLY SIGNAL VESA 800*600 75HZ , PATTERN : 2 "X2" PATCH .

2 SET BRIGHTNESS CONTROL TO THRESHOLD OF RASTER EXTINCTION .

3 WITH CONTRAST AT MAXIMUM , 41FL <= LIGHT O/P <= 55FL .

4 WITH CONTRAST AT MINIMUM , A LUMINANCE LEVEL OF LESS THAN 1FL MUST BE ACHIEVABLE .

4.2.8.3 Brightness Range

1 APPLY SIGNAL A FLAT WHITE FIELD .

2 ADJUST BRIGHTNESS TO THRESHOLD OF RASTER EXTINCTION CONTRAST FOR 25FL TO LUMINANCE .

3 WITH THE BRIGHTNESS CONTROL AT MINIMUM , A LUMINANCE LEVEL LESS THAN 20FL MUST BE PRESET .

4 SET CONTRAST TO MINIMUM .

5 WITH BRIGHTNESS AT MAXIMUM THE LIGHT O/P MUST UNDER 1.6

4.2.9 Power Management Tests

4.2.9.1 Power Consumption Test Table

MODE	SYNC PULSE			POWER(W) (TCO)	LED	RECOVERY TIME (SEC) TCO
	HORIZONTAL	VERTICAL	VIDEO			
NORMAL ON	YES	YES	YES	NORMAL	GREEN	—
SUSPEND	NO	YES	BLANK	< 15W	AMBER	< 3
	YES	NO	BLANK			
OFF	NO	NO	BLANK	< 8W		—

4.2.9.2 Test Pattern : VESA1280X1024/60HZ MODE AND FLAT WHITE FIELD .

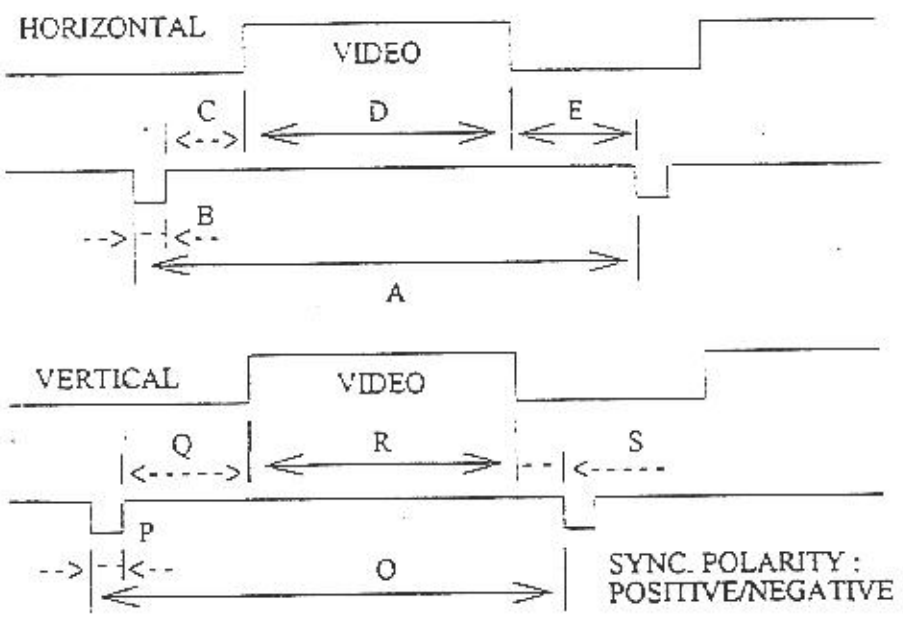
4.2.10 DDC Test : CONNECTS SIGNAL CABLE INTO DDC TESTER (D620) TO PROGRAM E
DATA SAVED IN E2PROM (IC51) .

1 THE EDID DATA SAVED IN E2PROM (IC51) SHOULD BE SAME AS SPECIFIED
APPENDIX DDC(ENGINEERING SPECIFICATION) .

2 EACH PRODUCTION UNIT SHOULD HAVE ITS OWN SERIAL NUMBER , WEEK

3 MANUFACTURE AND YEAR OF MANUFACTURE .

4.2.11 Timing of Input Signals



A : H-TOTAL TIME

B : H-SYNC PULSE WIDTH

C : H-BACK PORCH

O : V-TOTAL TIME

P : V-SYNC PULSE WIDTH

Q : V-BACK PROCH

D : H-DISPLAY TIME R : V-DISPLAY TIME

E : H-FRONT PORCH S : V-FRONT PORCH

MODE NO.	1	2	3	4	5
MODE NAME	VGA 640X 400	VGA 640X 480	8514A 1024X 768	VESA 640X 480	VESA 640X 480
HORIZONTAL DOTS	640	640	1024	640	640
VERTICAL LINES	400	480	768	480	480
PIXEL CLOCK (MHZ)	25.175	25.175	44.908	31.5	36.0
HORIZONTAL FREQ (KHZ)	31.47	31.47	35.528	37.50	43.27
SYNC. POLARITY	-	-	+	-	-
A H.TOTAL (us) (PIXELS)	31.778 (800)	31.778 (800)	28.146 (1264)	26.667 (840)	23.11 (832)
B H.SYNC (us) (PIXELS)	3.813 (96)	3.813 (96)	3.919 (176)	2.032 (64)	1.556 (56)
C H.BACK PORCH (us) (PIXELS)	1.907 (48)	1.907 (48)	1.247 (56)	3.810 (120)	2.222 (80)
D H.ACTIVE (us) (PIXELS)	25.422 (640)	25.422 (640)	22.802 (1024)	20.317 (640)	17.78 (640)
E H.FRONT PORCH (us) (PIXELS)	0.636 (16)	0.636 (16)	0.178 (18)	0.508 (16)	1.556 (56)
VERTICAL FREQ (HZ)	70.08	59.94	86.973	75.00	85.00
SYNC. POLARITY	+	-	+	-	-
O V.TOTAL (ms) (LINES)	14.268 (449)	16.684 (525)	11.498 (408)	13.333 (500)	11.76 (509)
P V.SYNC (ms) (LINES)	0.064 (2)	0.064 (2)	0.113 (4)	0.080 (3)	0.069 (3)
Q V.BACK PORCH (ms) (LINES)	1.112 (35)	1.048 (33)	0.563 (20)	0.427 (16)	0.578 (25)
R V.ACTIVE (ms) (LINES)	12.711 (400)	15.254 (480)	10.808 (384)	12.800 (480)	11.09 (480)
S V.FRONT PORCH (ms) (LINES)	0.381 (12)	0.318 (10)	0.014 0.000	0.027 (1)	0.023 (1)
SCANTYPE INTERLACED	NO	NO	YES	NO	NO

4.2.12 Magnetic Field For Factory Alignment

U.S.A. : VERT. 0.45 (GAUSS) HOR. 0.20 (GAUSS)

THE SOUTH AFRICA REPUBLIC : VERT. -0.25 (GAUSS)
HOR. 0.15 (GAUSS)

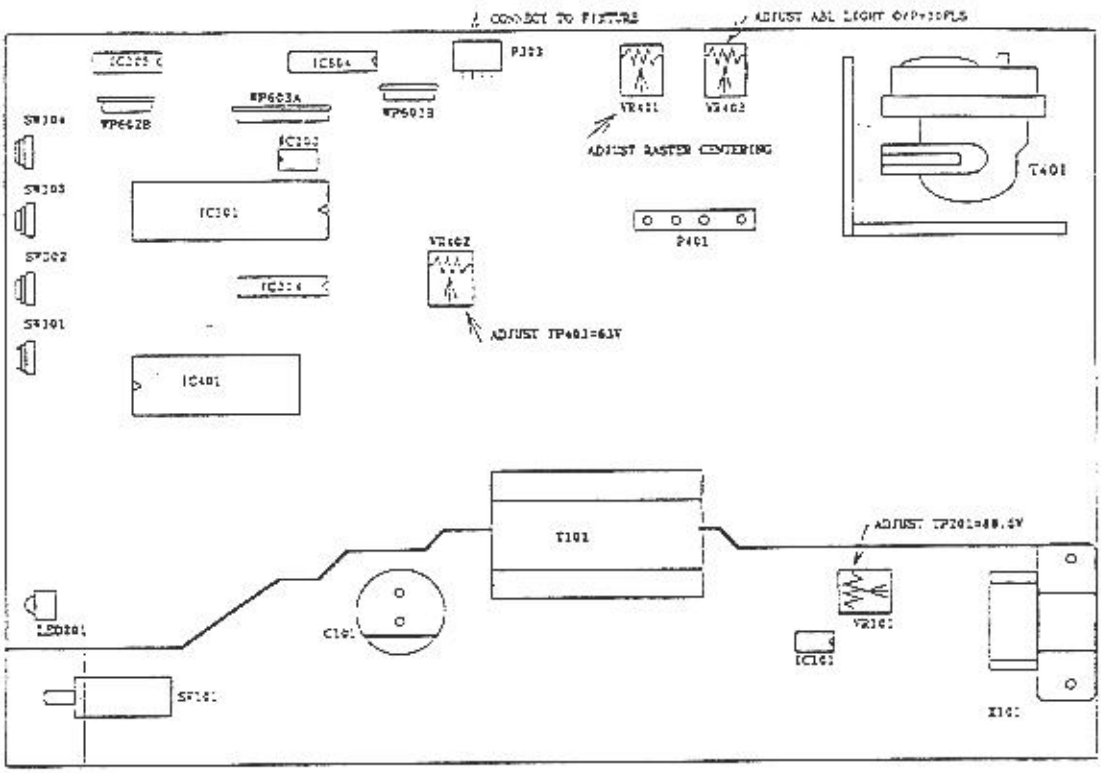
THE NORTHEM HEMISPHERE : VERT. 0.4 (GAUSS)
HOR. 0.0

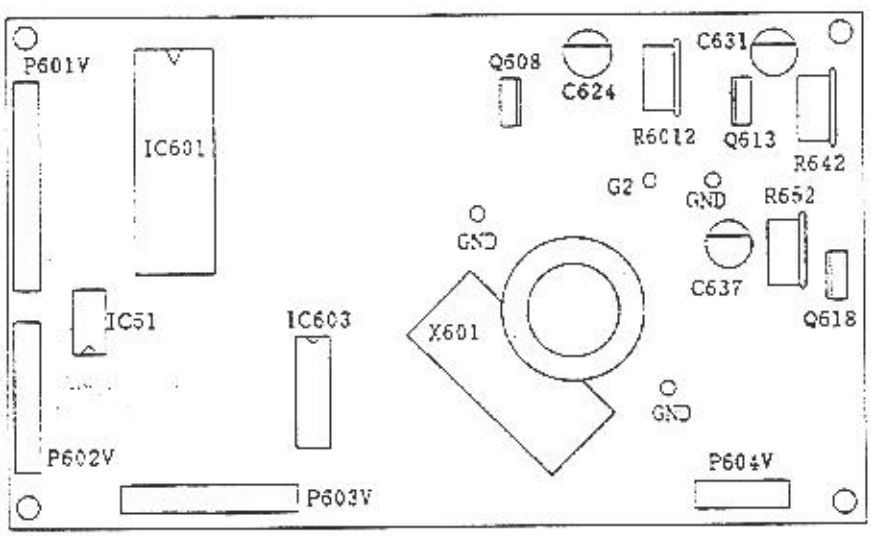
THE SOUTHERM HEMISPHERE : VERT. -0.4 (GAUSS)
HOR. 0.0

4.2.13 Horizontal Magnetic Field For Performance CRT Face

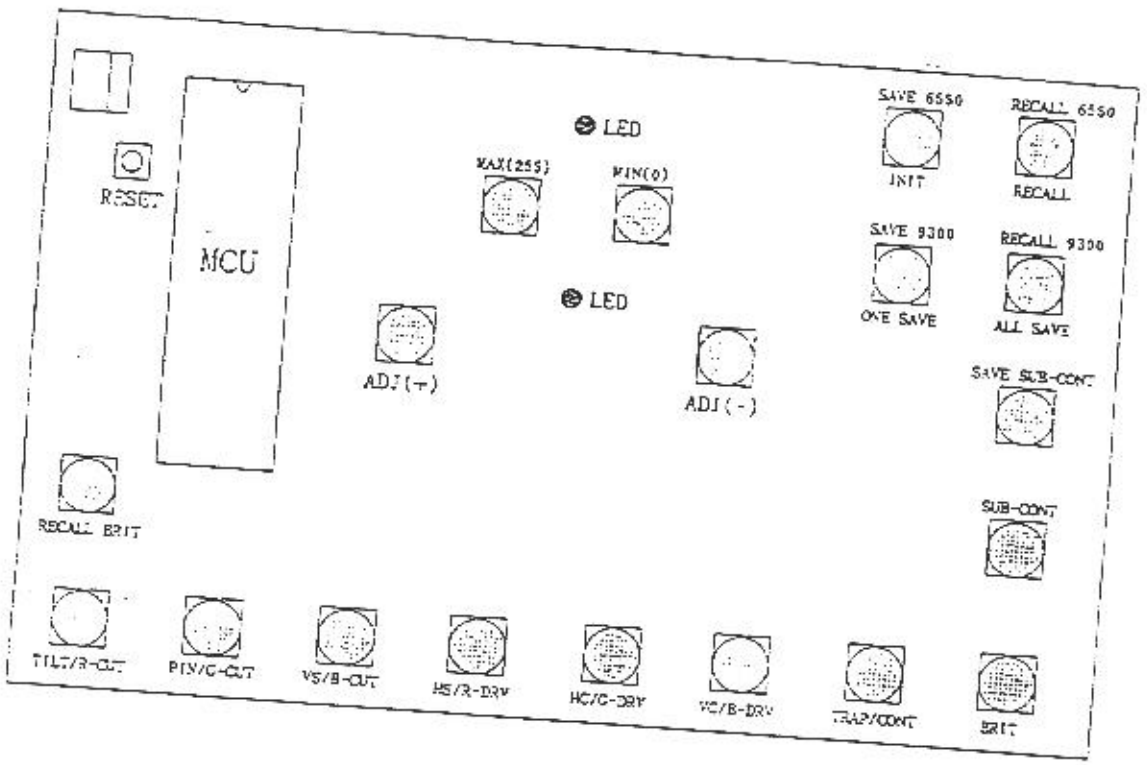
MODEL NUMBER	LOCATION	MAGNETIC REQUIREMENT
V655-2M	NORTH AMERICA	Bh = 250mG +- 10mG , BV = 490 +- 10mG
V655-2E	EUROPE	Bh = 250mG +- 10mG , BV = 430 +- 10mG
V655-2T	TAIWAN	Bh = 370mG +- 10mG , BV = 240 +- 10mG
V655-2A	AUSTRALIA	Bh = 250mG +- 10mG , BV= -500 +-1 0mG

MODE NO.	6	7	8	9	10
MODE NAME	VESA 800X 600	VESA 800X 600	VESA 800X 600	VESA 1024X 768	VESA 1280X 1024
HORIZONTAL DOTS	800	800	800	1024	1280
VERTICAL LINES	600	600	600	768	1024
PIXEL CLOCK (MHZ)	49.5	50	56.25	78.75	108.15
HORIZONTAL FREQ (KHZ)	46.875	48.077	53.674	60.023	63.974
SYNC. POLARITY	+	+	+	+	+
A H.TOTAL (us) (PIXELS)	21.333 (1056)	20.8 (1040)	18.631 (1048)	16.660 (1312)	15.631 (1696)
B H.SYNC (us) (PIXELS)	1.616 (80)	2.40 (120)	1.138 (64)	1.219 (96)	1.18 (128)
C H.BACK PORCH (us) (PIXELS)	3.232 (160)	1.28 (64)	2.702 (152)	2.235 (176)	2.065 (224)
D H.ACTIVE (us) (PIXELS)	16.162 (800)	16.0 (800)	14.222 (800)	13.003 (1024)	11.797 (1280)
E H.FRONT PORCH (us) (PIXELS)	0.323 (16)	1.12 (56)	0.569 (32)	0.203 (16)	0.59 (64)
VERTICAL FREQ (HZ)	75.00	72.188	85.00	75.029	60.00
SYNC. POLARITY	+	+	+	+	+
O V.TOTAL (ms) (LINES)	13.333 (625)	13.853 (666)	11.756 (631)	13.328 (800)	16.663 (1066)
P V.SYNC (ms) (LINES)	0.064 (3)	0.125 (6)	0.056 (3)	0.050 (3)	0.047 (3)
Q V.BACK PORCH (ms) (LINES)	0.448 (21)	0.478 (23)	0.503 (27)	0.466 (28)	0.594 (38)
R V.ACTIVE (ms) (LINES)	12.800 (600)	12.48 (600)	11.179 (600)	12.795 (768)	16.006 (1024)
S V.FRONT PORCH (ms) (LINES)	0.021 (1)	0.77 (37)	0.019 (1)	0.017 (1)	0.016 (1)
SCANTYPE INTERLACED	NO	NO	NO	NO	NO


CONNECT TO FIXTURE
ADJUST ABL LIGHT
P303
VR401
VR402
ADJUST RASTER CENTERING
T401
P401
VR602
ADJUST TP601=63V
IC101
IC401
T101
ADJUST TP201=48.5V
VR201
IC161
X101
C101
SW304
SW303
SW302
SW301


P601V
IC601
Q608
C624
C631
R6012
Q613
R642
G2
GND
R652
GND
C637
Q618
IC51
IC603
X601
GND
P602V
P603V
P604V

4.3 Fixture Function Key Description



TILT:
PIN:PINCUSHION
VS:VERTICAL SIZE
HS:HORIZONTAL SIZE
HC:HORIZONTAL CENTERING
VC:VERTICAL CENTERING
TRAP:TRAPEZOID

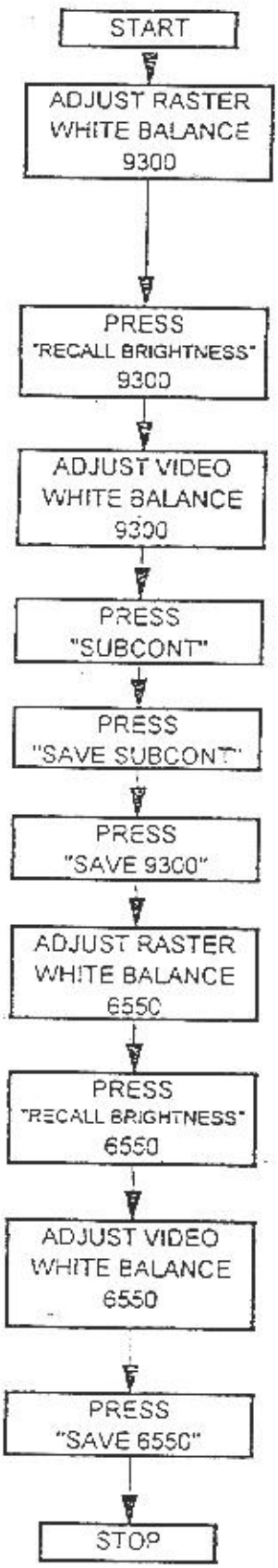
MAX(255):UP TO MAX SETING VALUE
MIN(0):DOWN TO MIN SETING VALUE
ADJ(+):STEP BY STEP INCREASE SETING VALUE
ADJ(-):STEP BY STEP DECREASE SETING VALUE
LED:CONFIRM BETWEEN FIXTURE AND MONITOR BUS LINK OK OR NOT

R-CUT:RED CUT-OFF(BIAS)
G-CUT:GREEN CUT-OFF(BIAS)
B-CUT:BLUE CUT-OFF(BIAS)
R-DRV:RED DRIVER(GAIN)
G-DRV:GREEN DRIVER(GAIN)
B-DRV:BLUE DRIVER(GAIN)
CONT:CONTRAST
BRIT:BRIGHTNESS
SUB-CONT:SUB-CONTRAST

4.4 Adjustment Key Define E655-1

GEOMETRY ADJUSTMENT		COLOR ADJUSTMENT	
BUTTON	FUNCTION	BUTTON	FUNCTION
SEQU	COPY FACTROY PRESET TO FINAL STATE	RECALL BRIT	RECALL CONTRAST & BRIGHTNESS PRESET
TILT	(VOLUME) NO USE		VALUE. (CONTRAST 100% , BRIGHTNESS 50%)
PIN	PINCUSHION ADJUSTMENT	R-CUT	R-CUT ADJUSTMENT(VOLUME NO USE)
VS	V-SIZE ADJUSTMENT	G-CUT	G-CUT ADJUSTMENT
VC	V-CENTER ADJUSTMENT	B-CUT	B-CUT ADJUSTMENT
HS	H-SIZE ADJUSTMENT	R-DRV	R-DRV ADJUSTMENT
HC	H-CENTER ADJUSTMENT	G-DRV	G-DRV ADJUSTMENT
TRAP	TRAPEZOID ADJUSTMENT	B-DRV	B-DRV ADJUSTMENT
BRIT	NO USE	CONT	CONTRAST ADJUSTMENT
SUB-CONT	NO USE	BRIT	BRIGHTNESS ADJUSTMENT
SAVE SUB-CONT	NO USE	SUB-CONT	SUB-CONTRAST ADJUSTMENT
ALL SAVE	SAVE ALL MODE	SAVE SUB-CONT	SAVE SUB-CONTRAST
ONE SAVE	SAVE CURRENT MODE	RECALL 9300	RECALL COLOR TEMPERATURE 9300
RECALL	ERASE DATA IN FINAL STATE	SAVE 9300	SAVE COLOR TEMPERATURE 9300
INIT	DOWNLOAD DEFAULT VALUE TO EEPROM	RECALL 6500	RECALL COLOR TEMPERATURE 6500
ADJ(+)	INCREASE DAC VALUE	SAVE 6500	SAVE COLOR TEMPERATURE 6500
ADJ(-)	DECREASE DAC VALUE	ADJ(+)	INCREASE DAC VALUE
MAX(255)	MAXIMIZE THE DAC VALUE	ADJ(-)	DECREASE DAC VALUE
MIN(0)	MINIMIZE THE DAC VALUE	MAX(255)	MAXIMIZE THE DAC VALUE
		MIN(0)	MINIMIZE THE DAC VALUE

E655-1 4.5 Color Adjustment Fixture Alignment Procedure



CONTRAST DEFAULT SETTING : 100 %
BRIGHTNESS DEFAULT SETTING : 50 %
INPUT TIMING : VESA47K
INPUT PATTERN : BLOCK 2" x 2"
CONTRAST TO MIN / BRIGHTNESS TO MAX
ADJUST SCREEN : Y = 0.5 ± 0.2 FL
ADJUST RGB-CUT : x = 281 ± 3 y = 311 ± 3
ADJUST SCREEN : Y = 1.0 ± 0.3 FL
ADJUST RGB-CUT : x = 281 ± 3 y = 311 ± 3

RECALL BRIGHTNESS TO 50 %
RECALL CONTRAST TO 100 %

ADJUST RGB-DRV : x = 281 ± 3 y = 311 ± 3

ADJUST SUBCONTRAST : Y = 46 ± 1 FL

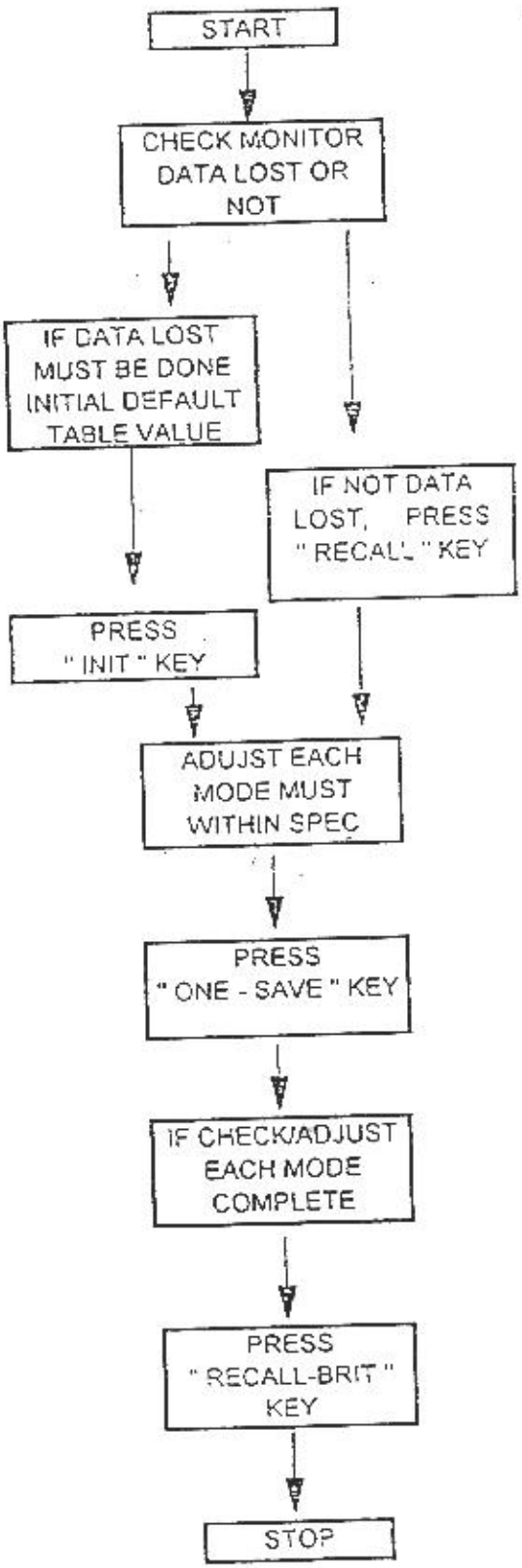
(AUTO SWITCH TO 6550)

CONTRAST TO MIN / BRIGHTNESS TO MAX
ADJUST RGB-CUT : x = 313 ± 3 y = 329 ± 3

RECALL BRIGHTNESS TO 50 %
RECALL CONTRAST TO 100 %

ADJUST RGB-DRV : x = 313 ± 3 y = 329 ± 3

E655-1 4.6 Geometry Adjustment Fixture Alignment Procedure


START
CHECK MONITOR DATA LOST OR NOT
IF DATA LOST MUST BE DONE INITIAL DEFAULT TABLE VALUE
IF NOT DATA LOST, PRESS " RECALL " KEY
PRESS " INIT " KEY
ADUJST EACH MODE MUST WITHIN SPEC
PRESS " ONE - SAVE " KEY
IF CHECK/ADJUST EACH MODE COMPLETE
PRESS " RECALL-BRIT " KEY
STOP

VOLUME DEFAULT SETTING : 0 %

TOTAL ADJUST MODE : 10 MODE AS FOLLOWS :

INPUT TIMING : VGA 640 * 400 / 31.5K / 70 HZ / - / +

INPUT TIMING : VGA 640 * 480 / 31.5K / 60 HZ / - / -

INPUT TIMING : 8514A 1024 * 768 / 35.5K / 87 HZ / + / +

INPUT TIMING : VESA 640 * 480 / 37.5K / 75 HZ / - / -

INPUT TIMING : VESA 640 * 480 / 43.3K / 85HZ / - / -

INPUT TIMING : VESA 800 * 600 / 47K / 75HZ / + / +

INPUT TIMING : VESA 800 * 600 / 48K / 72 HZ / + / +

INPUT TIMING : VESA 800 * 600 / 53.6K / 85 HZ / + / +

INPUT TIMING : VESA 1024 * 768 / 60K / 75 HZ / + / +

INPUT TIMING : VESA1280 * 1024 / 64K / 60 HZ / + / -

H-SIZE : 260 ± 3 MM / V-SIZE : 195 ± 3 MM

H-CENTER : ± 3 MM / V-CENTER : ± 3 MM

ERASE FINAL STATE DATA

DOWNLOAD DEFAULT VALUE TO MONITOR

SAVE CURRNET MODE DATA

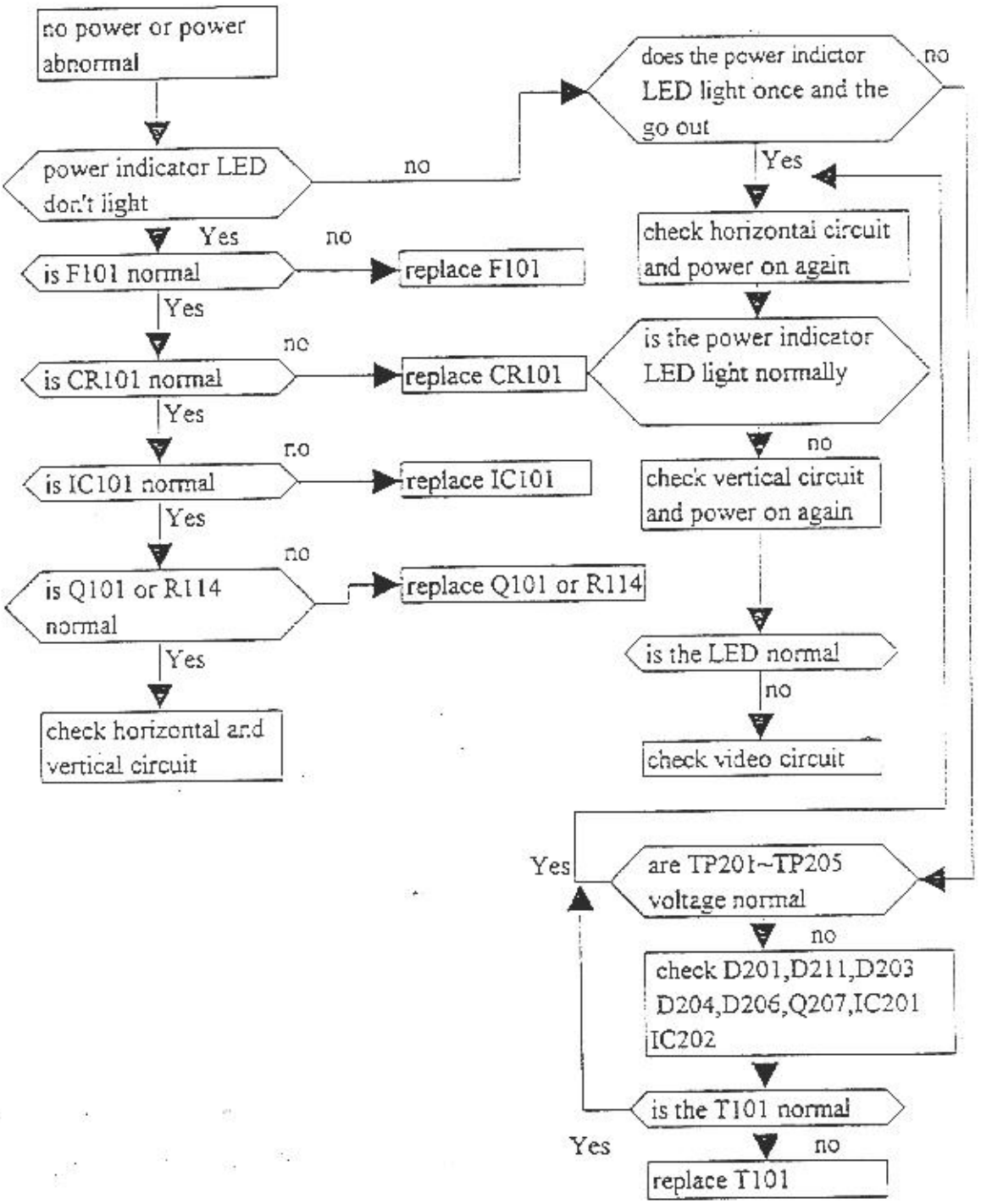
COPY FACTORY PRESET DATA TO FINAL STATE AREA

Chapter 5

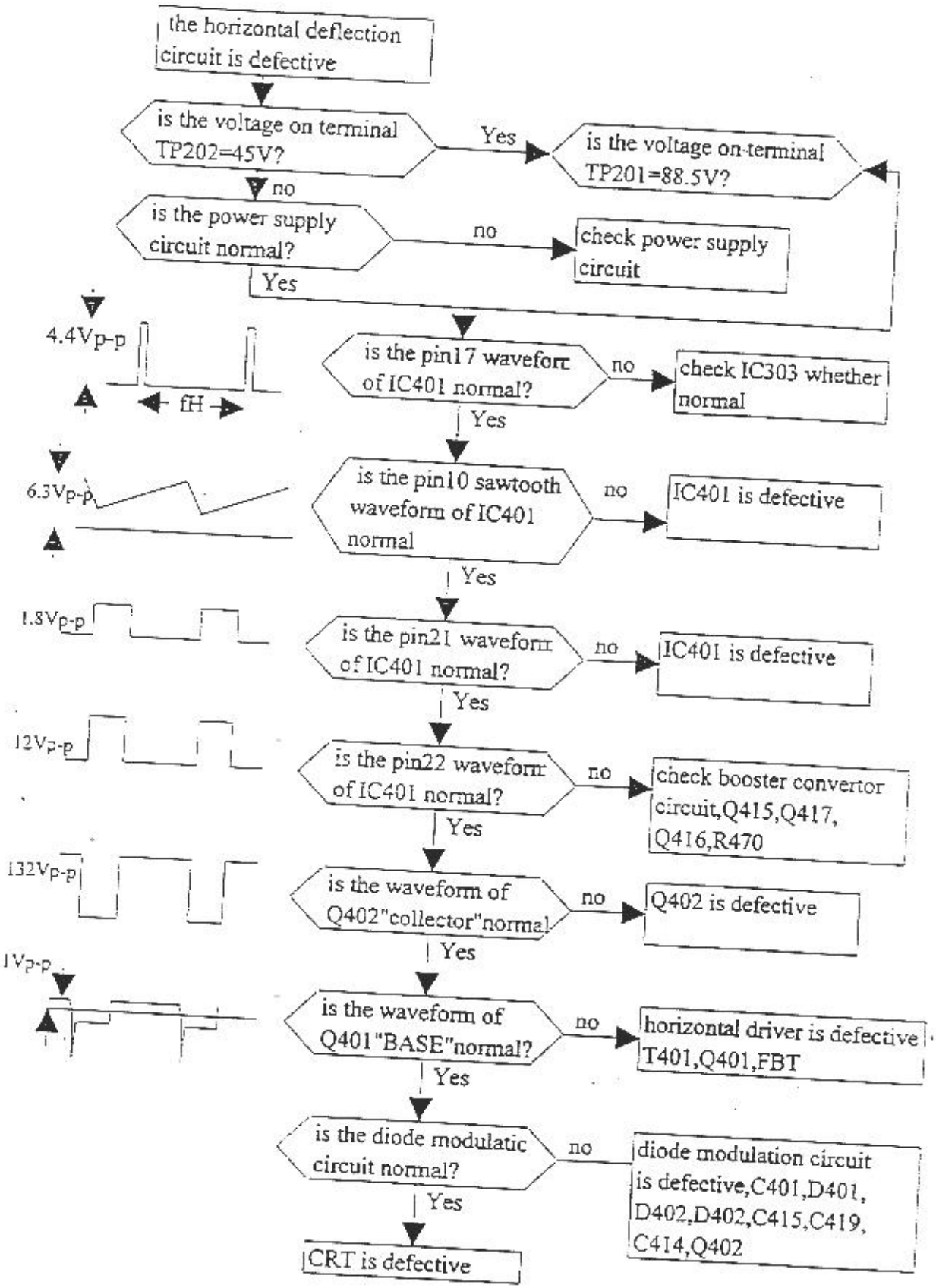
TROUBLE SHOOTING TIPS

5. TROUBLE SHOOTING TIPS 5-1
- 5.1 No Power 5-2
- 5.2 No Horizontal Deflection 5-3
- 5.3 No Raster 5-4
- 5.4 No Vertical Deflection 5-5
- 5.5 No Video 5-6
- 5.6 One Color Missing 5-7
- 5.7 No OSD 5-8

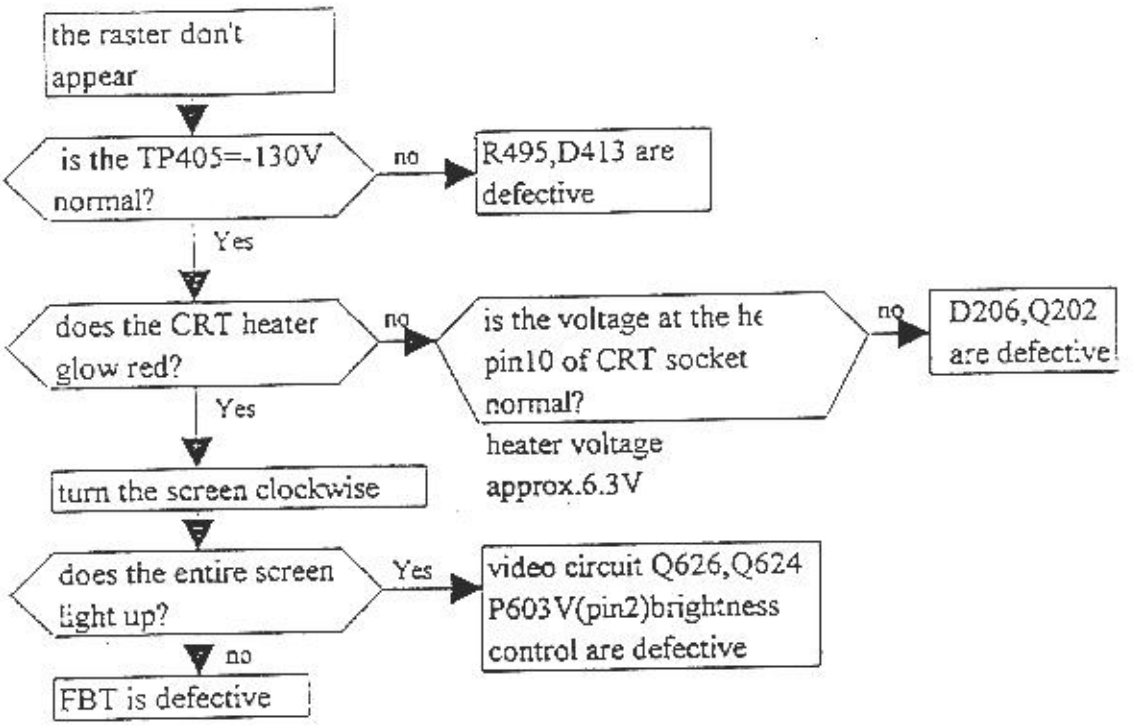
5.1 No Power


no power or power abnormal
power indicator LED don't light
no
does the power indictor LED light once and the go out
no
Yes
Yes
is F101 normal
no
replace F101
check horizontal circuit and power on again
Yes
is CR101 normal
no
replace CR101
is the power indicator LED light normally
Yes
no
is IC101 normal
no
replace IC101
check vertical circuit and power on again
Yes
is Q101 or R114 normal
no
replace Q101 or R114
is the LED normal
Yes
no
check horizontal and vertical circuit
check video circuit
Yes
are TP201~TP205 voltage normal
no
check D201,D211,D203 D204,D206,Q207,IC201 IC202
is the T101 normal
Yes
no
replace T101

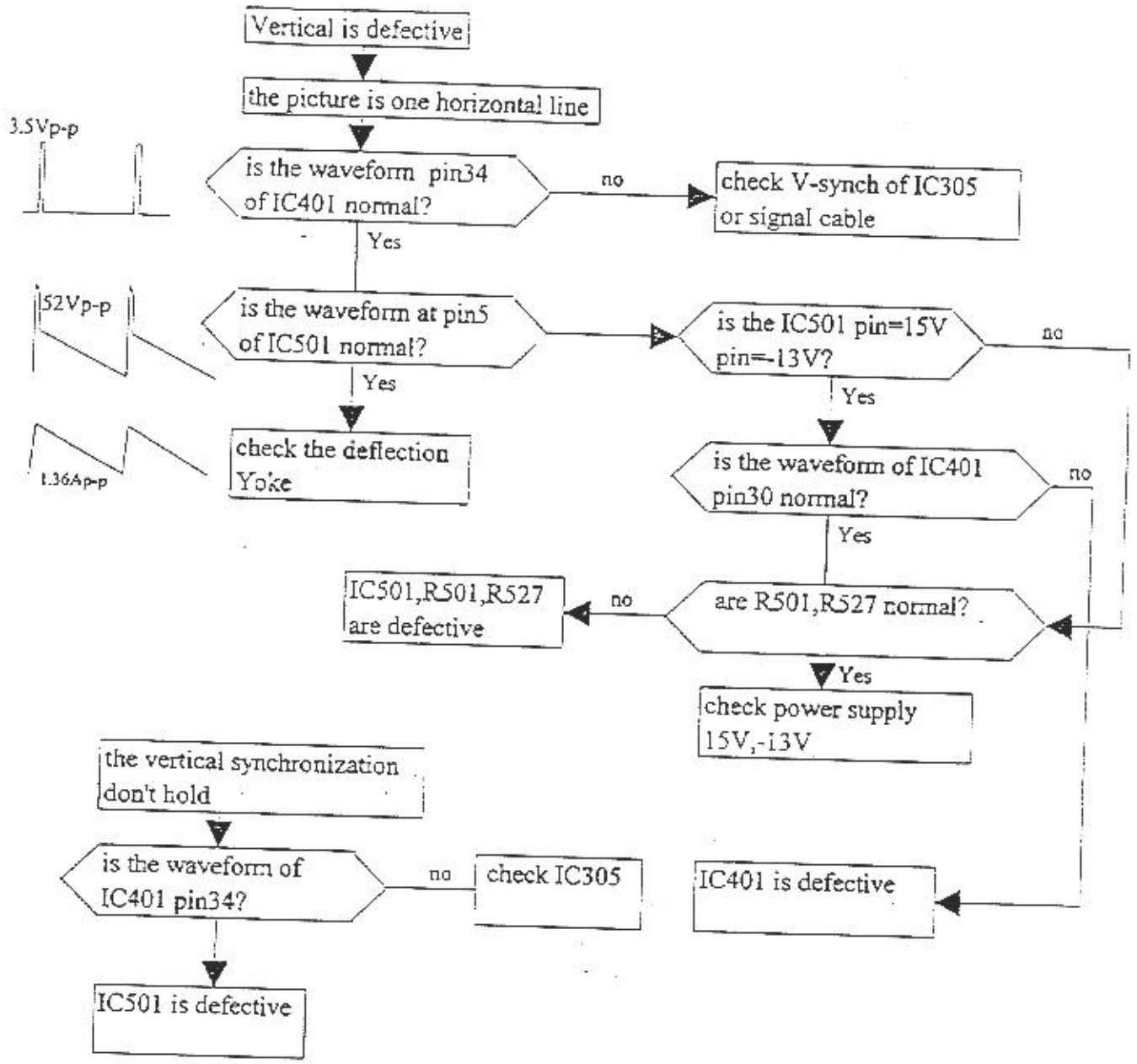
5.2 No Horizontal Deflection



5.3 No Raster


the raster don't appear
is the TP405=-130V normal?
no
R495,D413 are defective
Yes
does the CRT heater glow red?
no
is the voltage at the he pin10 of CRT socket normal?
no
D206,Q202 are defective
heater voltage approx.6.3V
Yes
turn the screen clockwise
does the entire screen light up?
Yes
video circuit Q626,Q624 P603V(pin2)brightness control are defective
no
FBT is defective

5.4 No Vertical Deflection

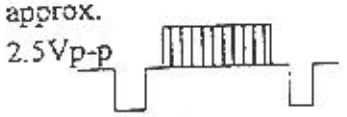


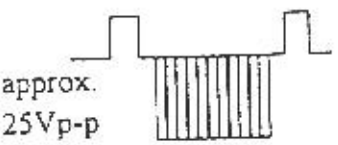
5.5 No Video

turn up the screen control and check whether the raster appear.

0.7Vp-p

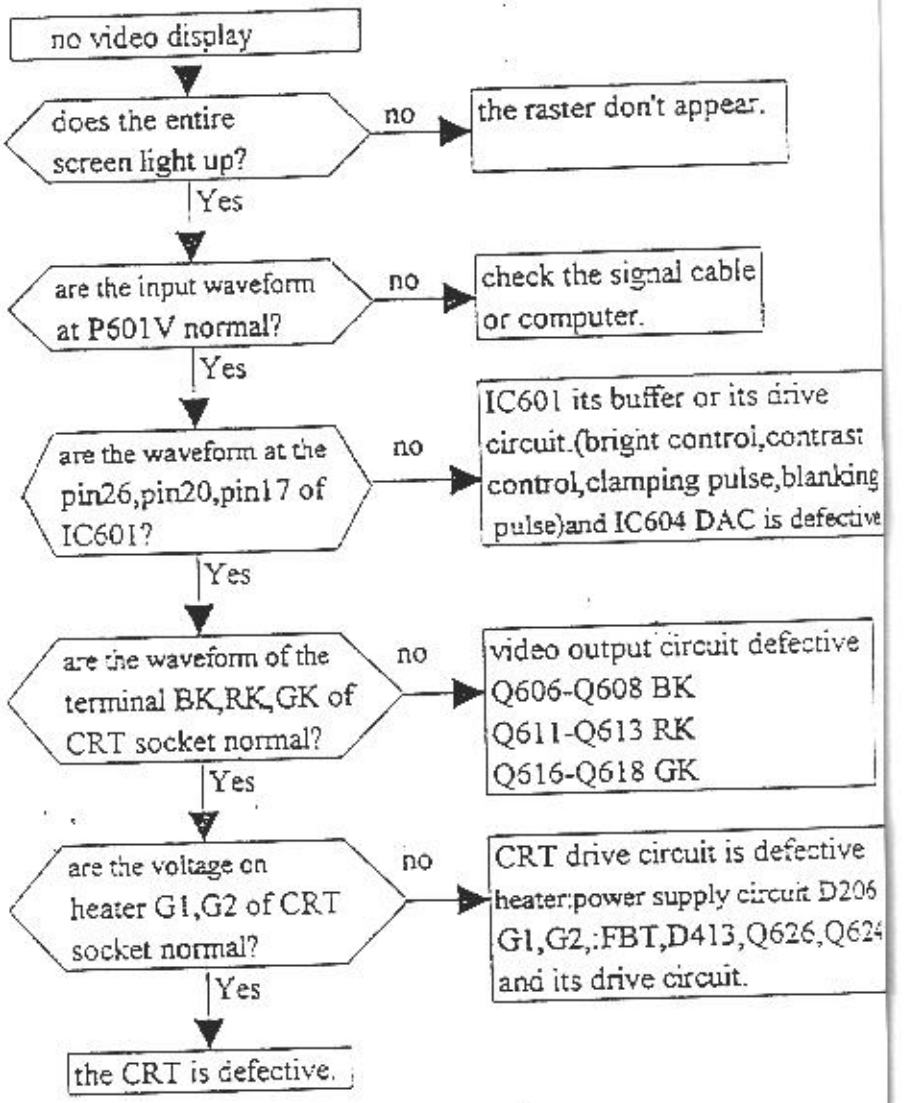
approx. 2.5Vp-p



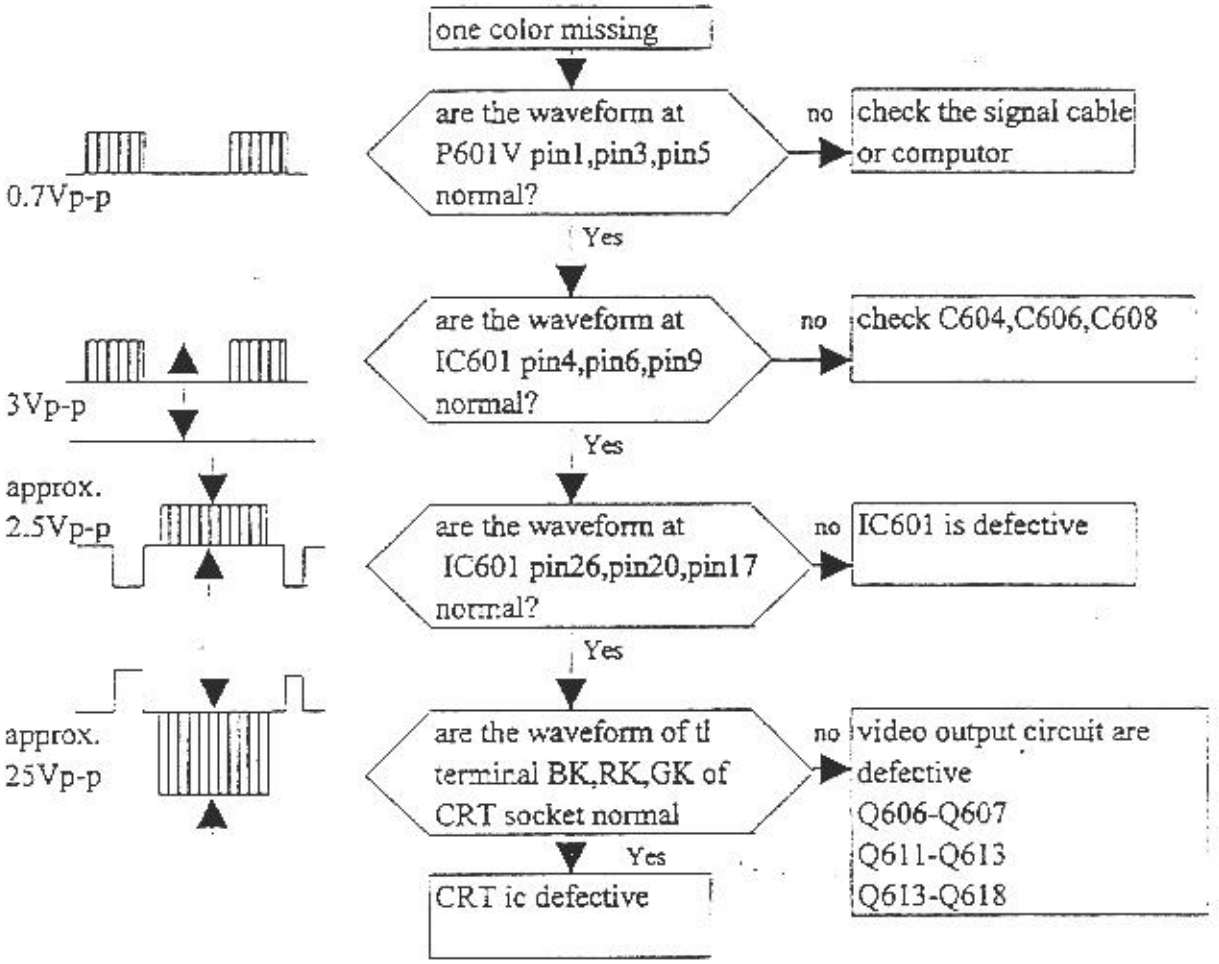


approx. 25Vp-p

heater:6.3VDC
G1:-70V
G2:550~700V

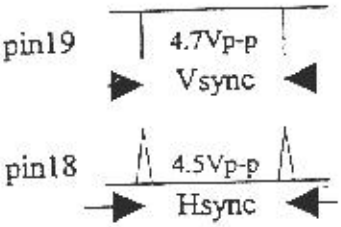


5.6 One Color Missing



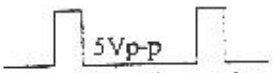
5.7 No OSD

Date:11-19-1996 Rev:01

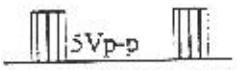


press control bottom,IC301 transfer CS SCL SDA clock pulse to IC603

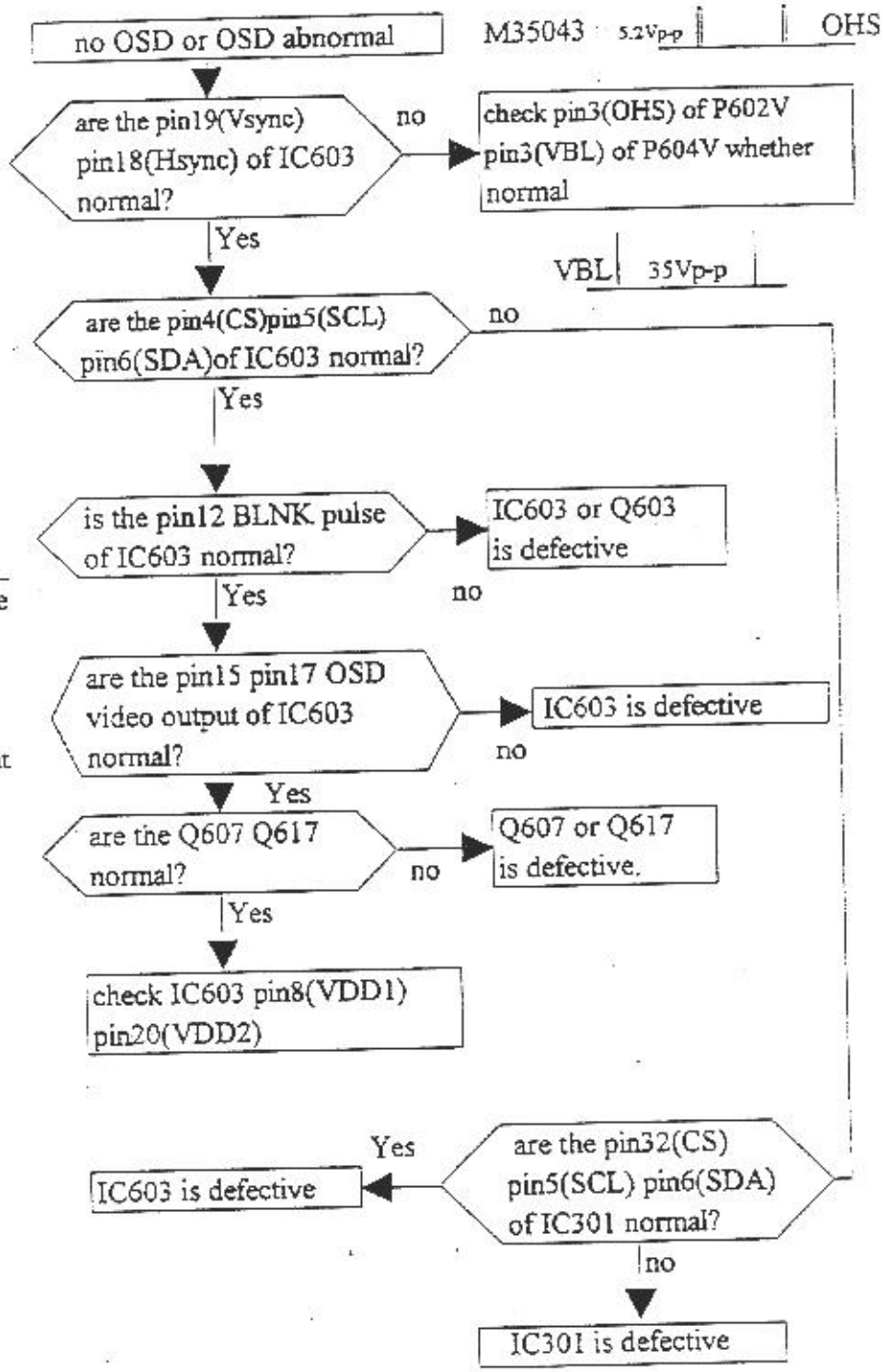
press control bottom



pin12 output blanking pulse



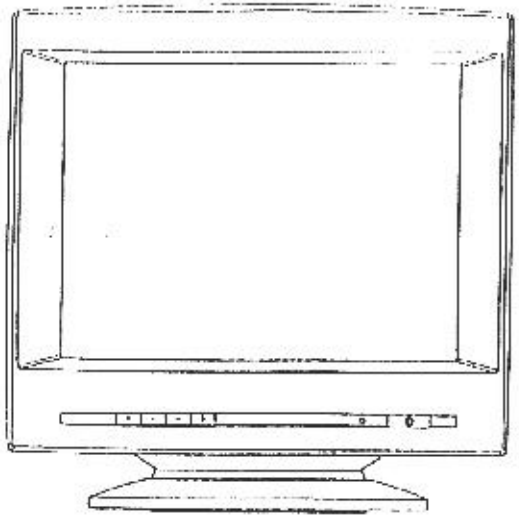
pin15 pin17 OSD video output

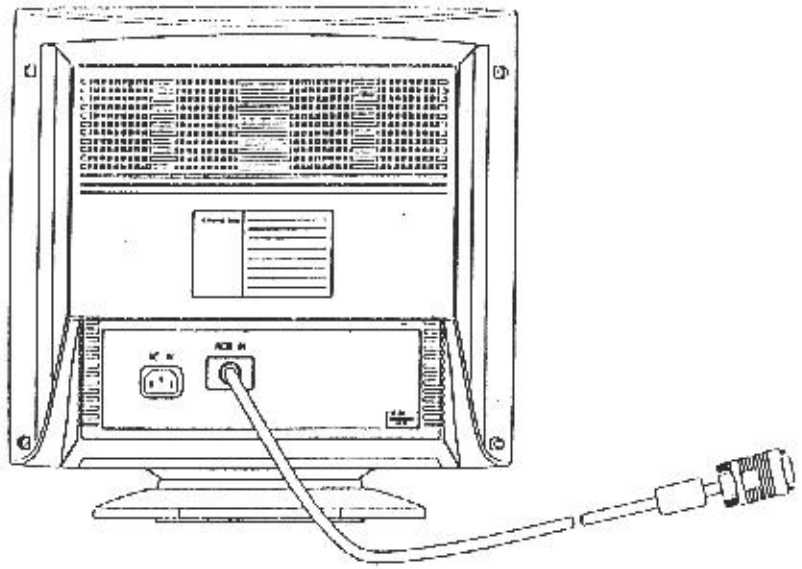


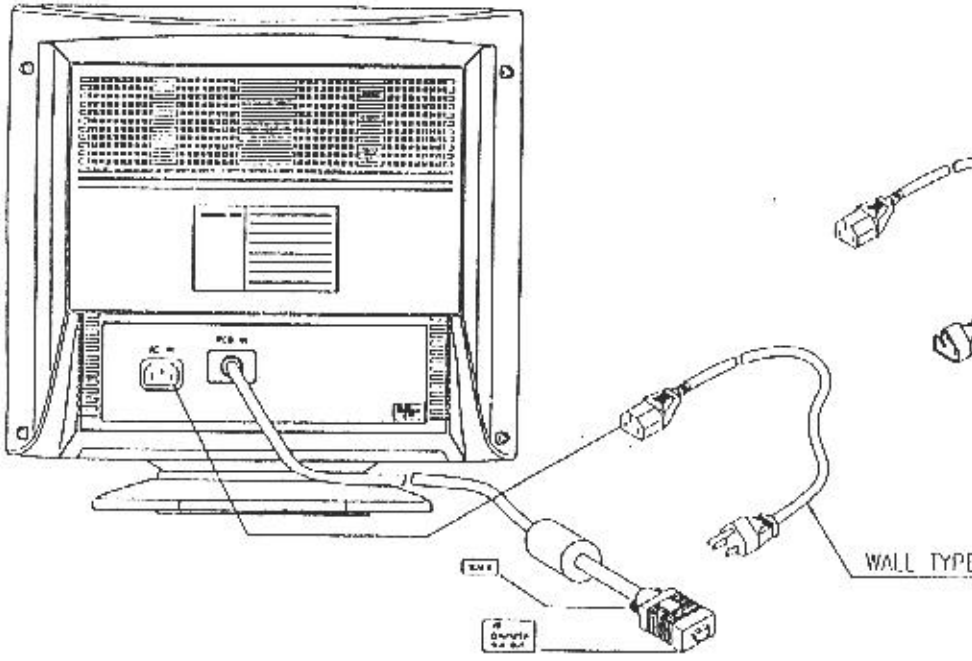
Chapter 6

MECHANICAL ASSEMBLY

6. MECHANICAL ASSEMBLY 6-1
- 6.1 Outline Drawing 6-2
- 6.2 Exploded View Drawing 6-3
- 6.3 FBT Assembly Drawing 6-4
- 6.4 Swivel Base Packing Location Drawing 6-5
- 6.5 Packing Assembly 6-6
- 6.6 CRT Grounding Wire Assembly 6-7





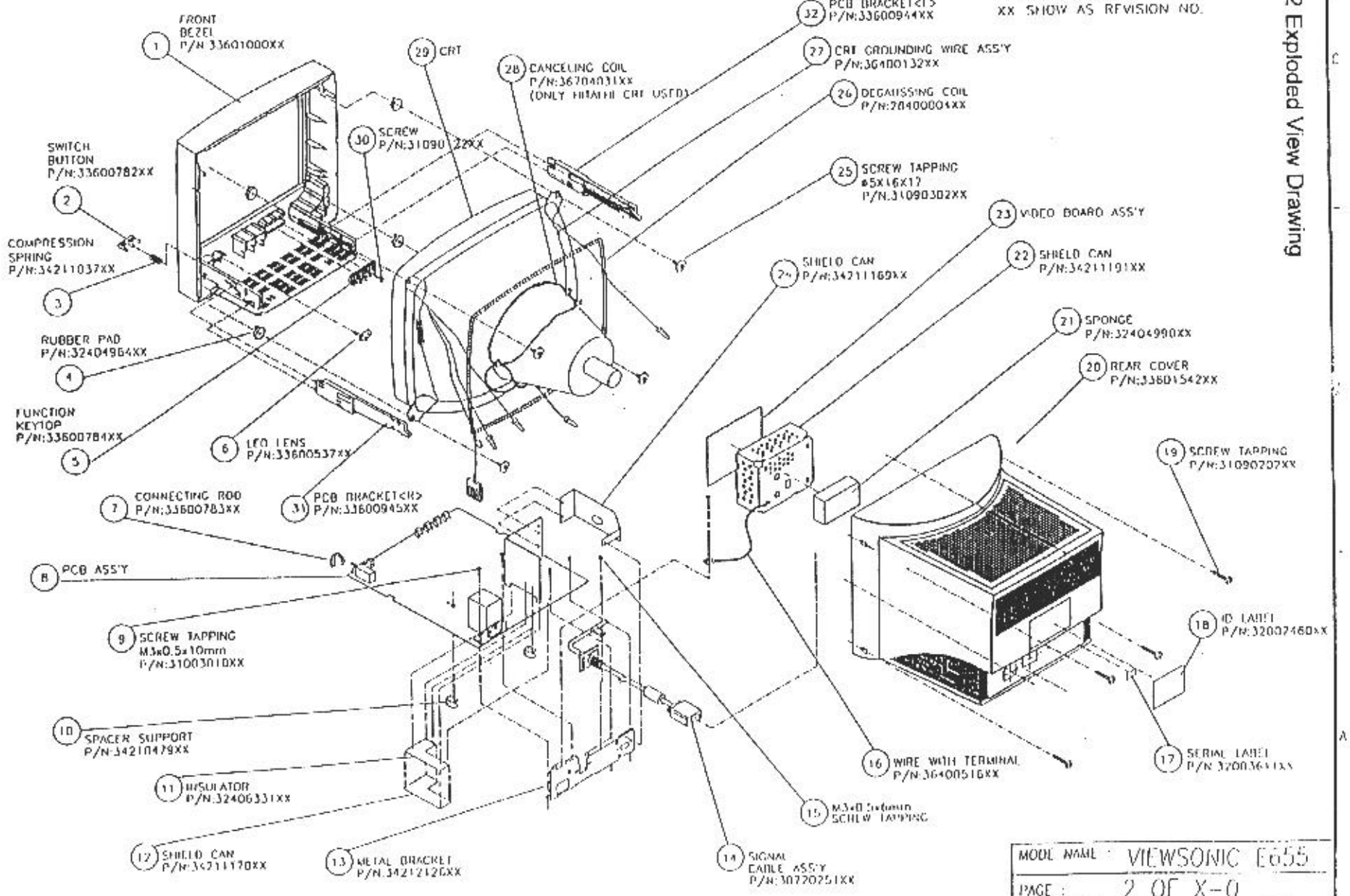


6.1 Outline Drawing

MODE NAME :	VIEWSONIC E655
PAGE :	1 OF X-0

MONITOR E655-1 PRODUCTION NOTICE ITEM

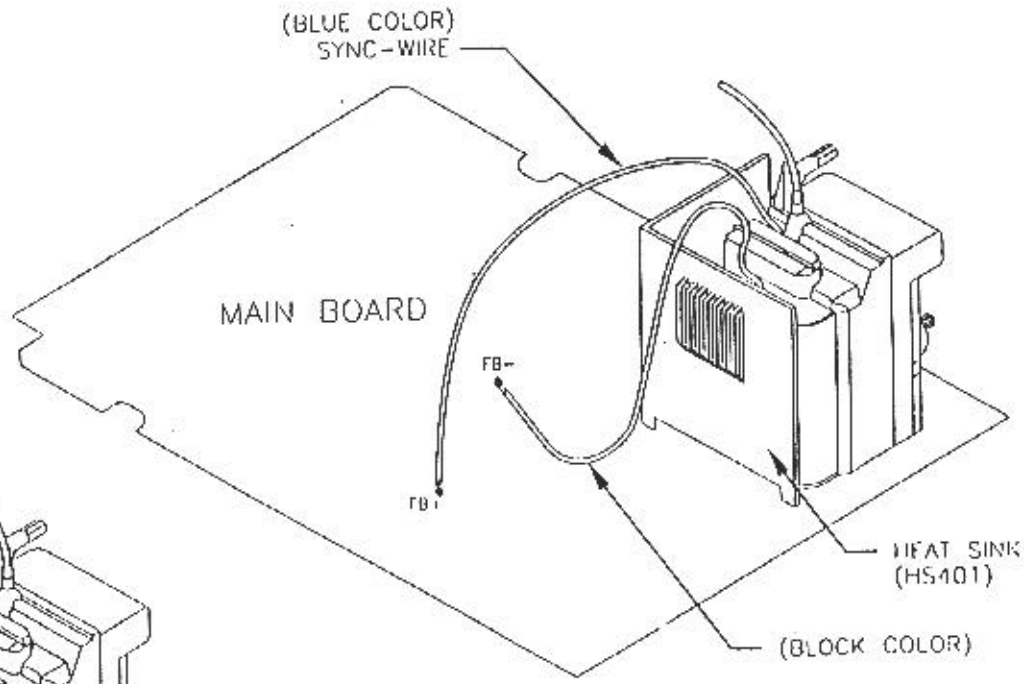
REMARKS : P/N : —— XX
XX SHOW AS REVISION NO.


1 FRONT BEZEL P/N 33601000XX
2 SWITCH BUTTON P/N:33600782XX
3 COMPRESSION SPRING P/N:34211037XX
4 RUBBER PAD P/N:32404964XX
5 FUNCTION KEYTOP P/N:33600784XX
6 LED LENS P/N:33600537XX
7 CONNECTING ROD P/N:33600783XX
8 PCB ASS'Y
9 SCREW TAPPING M3x0.5x10mm P/N:31003010XX
10 SPACER SUPPORT P/N:34210479XX
11 INSULATOR P/N:32406331XX
12 SHIELD CAN P/N:34211170XX
13 METAL BRACKET P/N:34212126XX
14 SIGNAL CABLE ASS'Y P/N:30720251XX
15 M3x0.5x6mm SCREW TAPPING
16 WIRE WITH TERMINAL P/N:36400516XX
17 SERIAL LABEL P/N:32003631XX
18 ID LABEL P/N:32007460XX
19 SCREW TAPPING P/N:31090207XX
20 REAR COVER P/N:33601542XX
21 SPONGE P/N:32404990XX
22 SHIELD CAN P/N:34211191XX
23 VIDEO BOARD ASS'Y
24 SHIELD CAN P/N:34211169XX
25 SCREW TAPPING ø5X16X17 P/N:31090302XX
26 DEGAUSSING COIL P/N:28400004XX
27 CRT GROUNDING WIRE ASS'Y P/N:36400132XX
28 CANCELING COIL P/N:36704031XX (ONLY HITACHI CRT USED)
29 CRT
30 SCREW P/N:31090 22XX
31 PCB BRACKET<R> P/N:33600945XX
32 PCB BRACKET<L> P/N:33600944XX

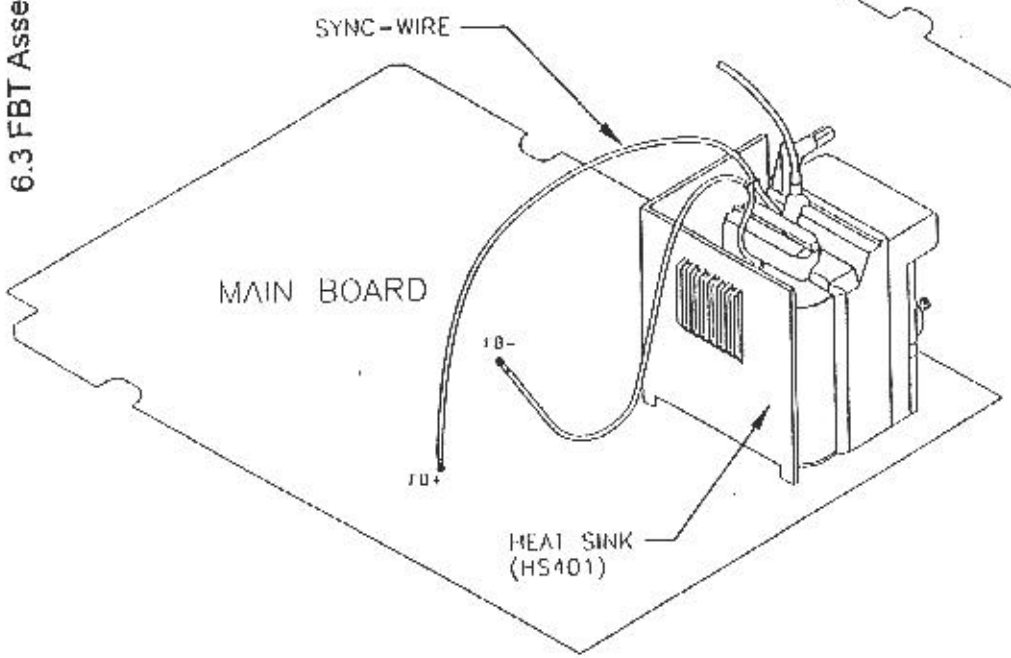
MODEL NAME :	VIEWSONIC E655
PAGE :	2 OF X-0

6.3 FBT Assembly Drawing

FOR MATSUSHITA FBT



FOR SAMPO FBT



MODEL NAME : VIEWSONIC E655
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6.4 Swivel Base Packing Location Drawing

MONITOR E655-1 PRODUCTION NOTICE ITEM

RIGHT (○)

WRONG (X)

MODEL NAME : VIEWSONIC E655
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